DESCRIPTIVE GEOGRAPHY FROM ORIGINAL SOURCES

BY A. J. HERBERTSON AND L. JOWETT

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THE BRITISH ISLES

Descriptive Geographies from Original Sources

THE BRITISH ISLES

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PREFACE

THE present volume differs from the others in the same series, in that the introduction is shorter and more limited in scope. I have had to choose between reducing still further the extracts drawn from the rich stores of geographical literature available, and omitting the detailed introduction of the earlier volumes. The fact that several admirable school text-books in geography have been published within the last few years, and are being widely adopted, has rendered my decision the easier. I hope that the *Descriptive Geography of the British Isles* may be used to supplement these, and to illustrate points which are raised in class discussions.

A study of the British Isles figures twice on many school syllabuses—first at an age when children are still mainly dependent on oral teachings, and secondly in the middle or upper forms when pupils begin a more critical study of cause and effect, and of the interaction of various groups of phenomena. Probably many teachers feel it desirable at this stage to send boys and girls straight to original sources. The object of this little book will have been attained if young students are beguiled through its pages to probe yet further for themselves into the heart of such stimulating books as Lord Avebury's *Scenery of England*, Mr. Mackinder's *Britain and the British Seas*, or Sir. A. Geikie's *Scenery of Scotland*.

The Bibliography appended is necessarily incomplete, and may appear somewhat arbitrary. It has been compiled with a view to the needs and possibilities of a school library; hence reference is not, as a rule, made to geological papers on the ground of their being too technical to be within the comprehension of a student with no preliminary training in geology. A considerable number of topographical books, such as Messrs. Macmillan's *Highways and Byways* series, or Messrs. Methuen's *Little Guides*, are included as being well calculated to rouse a real interest in local geography.

In order to ensure continuity it is not always shown where an extract has been abridged.

For the introductory matter I am under a special obligation to Dr. H. R. Mill, Mr. H. J. Mackinder, and Dr. A. J. Herbertson. For the rest, I have taken the opportunity of acknowledging my indebtedness to learned societies, publishers and authors, at the end of each extract.

L. J.

BRISTOL,
June, 1909.

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INTRODUCTION

THE CHIEF PHYSICAL DIVISIONS OF THE BRITISH ISLES

Position.— The submarine platform from which the British Isles rise above the water is a part of the great Continent of Europe. The surface of this submerged platform was once above the level of the ocean surface, and even now the waters which cover it nowhere reach a depth of 100 fathoms. Britain, then, is really a part of the Continent of Europe, and that it is an island is due to the present level of the sea relatively to the land.

To the west of the Shetlands, the Outer Hebrides and the west coast of Ireland—that is to say, beyond 100 fathom line—the sea-bed slopes suddenly down to a depth of 1000 and more fathoms. This slope marks the real edge of the Continent.

Configuration.—There are now no lofty mountain chains or very great rivers in the British Isles, but there is much variety of land form and scenery, the result of geological changes in the past, and of the varying action of erosion upon different kinds of rock still going on in the present.

A comparison of a physical map showing relief, and a geological map showing rock-structure, suggests certain regions, each with distinct physical characteristics of its own, into which the British Isles may be roughly subdivided.

The regions into which Scotland naturally falls are: (1) The Highlands and outlying islands to the north and west; (2) the North-East Coastal Plain; (3) the Central Lowlands; (4) the Southern Uplands. The trend of the feature lines is from south-west to north-east.

The *Highlands* have an average elevation of 1500 feet, though in places they rise to nearly three times that height. There is no well-marked mountain range. "The surface has been carved by rivers and atmospheric erosion into masses, which, looked at from below, have the appearance of mountains; but, viewed from one of the highest summits, the Highlands appear as round-shouldered and flat-topped moorlands, covered with moss or heather or shattered stones. They are of fairly uniform general height, and rise without definite order, like waves on a stormy sea."

The glaciated valleys of the west coast are very deep, and form long fjords, which separate from the mainland the volcanic rocks forming the islands of Skye, Mull, and the Inner Hebrides.

The North-East Coastal Plain.—Nine-tenths of the whole population north of the southern escarpment of the Grampians are concentrated along the coastal sill round Moray Firth, and in the plains of Caithness and Buchan. The latter especially is a well-populated and fertile region. Beyond the North-Western Highlands the Old Red Sandstone plain of Caithness is really a detached portion of the fertile Lowlands, better cultivated and more densely peopled than the Highland counties. The Orkneys are a continuation of this plain, though now separated from it by the dangerous sound of the Pentland Firth.

The *Central Lowlands* have an average elevation of under 500 feet, and occupy a rift valley some fifty miles wide between the Highlands and the South Uplands. The floor of this plain consists of Carboniferous Limestone, rich in coal, while above the floor rise old hard igneous rocks forming precipitous crag as, for example, the castle rocks of Edinburgh and Stirling. Strathmore, a broad belt of fertile lowland, is of Old Red Sandstone formation, and is bounded on the south by the Ochil Sidlaw ridge, built up of volcanic materials.

The *Southern Uplands*, with an approximate average height of 1000 feet, rise steeply from the Lowlands and stretch from sea to sea. They are a plateau of old hard rocks deeply trenched by river valleys, which separate them into rounded masses of fairly uniform height. The Tweed traverses the Uplands from south-west to north-east, in conformity with the general trend of the feature lines. Its lower valley forms a plain of considerable extent near the coast.

In the main the Southern Uplands are a thinly peopled pastoral region. Galloway, in the south-west corner, is the highest and most rugged part. South of Galloway there is another fertile coastal plain, important as affording an easy route round the Solway Firth.

The Cumbrian Lake District.—South of the Solway Firth there is a small rugged highland separated from the Pennine Chain by the valleys of the Lune and the Eden. The rocks are mainly of volcanic origin, and consist of great masses of slate. The hills are trenched by deep glens radiating in all directions, and each valley contains a narrow lake-bed. Many geologists are of opinion that these lake-beds are of Glacial origin. The little Manx Upland, only separated by shallow waters from the English coast, but by deep waters from Ireland, is a detached fragment of the Cumbrian Upland, consisting of similar rocks.

The Cumbrian Upland, though of quite different structure, and built of far more ancient rocks, is connected with the Pennine Chain by the neck of high ground known as Shap Fell.

The *Pennines* form an upland area which was once raised like a great arch, with slopes running down to the east and west. The centre of the system is composed of sandstone and limestone, which are exposed along a central line owing to the wearing away of the top of the arch by wind, frost, and rain. Younger rocks, including coal, once formed the top of this arch, but now the Coal Measures are only left on the flanks, resulting in the Northumberland-Durham, Yorkshire, and Nottingham coal-fields on the east and the South Lancashire coalfield on the west.

The Carboniferous Limestone exposed in the north and south parts of the ridge weathers into picturesque heights and valleys; the middle portion, formed of Millstone Grit, weathers into flatter-topped hills and grass-covered uplands.

The East Yorkshire Plain and the Basin of the Ouse.—East of the Pennines stretches a wide level plain dipping gently to the Humber, to which the basin of the Trent runs northward and the Ouse southward. This plain, underlaid by New Red Sandstone, is very rich agriculturally. Especially fertile is the Vale of York, which is covered with alluvial and glacial deposits. The easternmost extent of this plain is Holderness, a stretch of lowland formed by Glacial Drift, Clays, and Gravel.

The *Central Plain* of England includes the rich meadow lands drained by the Weaver, the Dee, and the Mersey, and the Midlands lying between the Upper Trent, the Severn, and the Warwickshire Avon. It is undulating country of Marl or Limestone formation. Cannock Chase and the Lickey and Clent Hills mark the existence of older and harder rocks. This is a very rich agricultural region, and was formerly covered by extensive forests, the names Forest of Arden and Charnwood Forest being still applied to large districts. The red rocks which underlie a great part of the plain of the Midlands contain beds of rock salt. Coal Measures have been exposed by denudation on the margin of the Highlands, and have given rise to the industrial towns of the Black Country.

Wales and the Welsh Marches.—Wales is another upland country, and its mountains and valleys have been formed by the erosion of a very old plateau. Very ancient rocks are exposed in some parts of the country, especially in Carnarvon and Pembroke, while masses of igneous rock form Snowdon and the surrounding group. Slate is very extensively quarried in the mountains of North Wales.

The Coal Measures of the North-East and South are contained in basins or troughs. A great expanse of Old Red Sandstone rises into the Black Mountains and Brecon Beacons of South Wales, and on the east sinks to form the low and fertile plain of Hereford.

The Scarplands.—South and east of a line drawn across England from the mouth of the Tees to the mouth of the Axe, the rocks underlying the surface of the country are younger and less resistant than the rocks we have spoken of to the north and west of the same line. These rocks rise to a height of over 1000 feet in the highest points of the Cotswold Hills and North Yorkshire moors, but their general level is nearer 500 feet, because they are so much more easily worn down by the action of wind and rain than are the harder, more resistant rocks.

Skirting the underlying red rocks (Triassic) of the Midlands, a series of bands of these less resistant rocks sweep across England in a curve from north-east to south-west. The first of these bands or belts—that is, the first which would be crossed in travelling from Birmingham to London—is a belt of Jurassic Limestone, running from the Cleveland Hills in the north-east to the Cotswolds and beyond in the south-west. The weathered edge of these beds forms a more or less continuous escarpment or line of heights, presenting quite a bold front to the north and west, but sloping gradually to the east and south-east in broad plains of clay with interbedded sands.

These clays and sands underlie Oxford and Bedford, and in their turn dip under the next belt, the Cretaceous (Chalk) belt.

which sweeps across the country in a similar curve from Flamborough Head in the north to the mouth of the Axe in the south. The chalk escarpment may be traced in the succession of gentle heights variously known as the Dorset Downs, the Marlborough Downs, the Chiltern Hills, the East Anglian heights, and the Lincolnshire and Yorkshire Wolds. These beds of chalk again slope eastwards and south-eastwards until they pass under the thick clays on which London has been built.

The whole of this area of Scarplands was once covered by a great ice-sheet, thick enough to cover hills as well as plains, which left behind it boulder-clay. Boulder-clay is rock-waste first split off, and then ground fine by the friction and weight of the great ice-sheet moving slowly over it. Much of the surface-soil consists of this boulder-clay, which forms just that stiff soil that wheat requires.

The Fenlands.—In East Anglia the hills nowhere rise to as much as 300 feet above the sea, and the chalk and clay beds of the intervening lower ground sink so low that they have been invaded by the sea in the Wash. Over a large area the clay beds have been buried beneath marshy flats of alluvium and peat. This district is the Fenland. The marshes of the Fens have been reclaimed, and now form wide, flat plains of arable land.

South England and the Southern Scarps.—The feature lines of South England run east and west in a series of ridges and plains. The chalk and limestone heights are given over to sheep pastures, while the clay plains and sandstone ridges are rich agricultural lands.

The chief hills of South England are of chalk: these are from west to east, the Salisbury Downs, the Hampshire Downs, and the North and South Downs. The bed of the lower Thames, occupying a depression in the chalk, is of gravel and clay; so are the plains of Dorset and Hampshire.

Between the North and South Downs lies a tract of land called the Weald, a word of the same derivation as the German "Wald," for this region was once thickly forested. Chalk occurs again in the south of the Isle of Wight, and forms the stacks off the coast called the "Needles."

South-West England.—The peninsula of Cornwall and Devon forms a natural region of very ancient rocks—Old Red Sandstone and granite. The former rises in the barren Upland of Exmoor; the latter in the plateau of Dartmoor, in the great boss of Bodmin Moor, and in the Land's End peninsula. The granite weathers into clay, which allows marshes and peat-bogs to form. The decomposed granite itself forms china-clay (kaolin), a valuable product which is not found on the granites of Scotland or Northern England, whence all soft material was swept away by the ice sheet of that far-away time which we allude to as the Ice Age.

IRELAND

Position.—Ireland stands on the extreme edge of the European plateau, the sea-floor sinking suddenly to great depths on the west. On the east it is divided from Great Britain by the Irish Sea, generally less than 70 fathoms deep, which measures 130 miles across at its broadest, but narrows to the North Channel in the north, and in the south to St. George's Channel. This sea, which is almost land-girt, has been well called the English Mediterranean.

The western coast-line is deeply indented with many fjord-like inlets, affording deep harbours and separated by hill peninsulas. Compared to the similarly drowned shore-line of the west coast of Scotland, it has but few islands, probably because it has not sunk so far below its former level. The attack of the Atlantic rollers has in places formed cliffs of considerable height.

Configuration.—In general configuration Ireland is very different to Great Britain, for it has no backbone of mountains; on the contrary, the centre of the country is occupied by a great plain of Limestone formation, while the islands are grouped along the coast.

The Central Lowland.—The Carboniferous Limestone underlies a wide stretch of country, which is, in general, a lowland reaching almost from sea to sea. It includes stretches of green meadow land, brown bogs, and numerous lakes. The plain is crossed roughly from north to south by the Shannon, the longest river of the British Isles, and its important tributary the Suck. The Shannon is everywhere broad, and for the greater part of its course is slow-flowing. Flowing south through an almost flat tract of country, it spreads to the breadth of a lake, and forms the long loughs of Ree and Derg, dividing the plain into Connaught to the west, and Meath to the east. The river gains in speed as it flows down the steep slope of the mountains at the southern end of Lough Derg, and carries a great volume of water to the head of its tideway, where Limerick is situated.

This central plain occupies about one-third of the surface of the country. It is most fertile where it extends eastwards to the Irish Sea. The rainfall is less than in the west, and the summer warmer, so that five-eighths of the barley of Ireland is produced in the basins of the rivers which drain into the harbours of Waterford and Wexford.

The Southern Mountains.—The mountains of Cork and Kerry, consisting of parallel ranges and valleys running from west to east, are the most continuous in Ireland. Their western ends have been submerged, with the result that long, shallow inlets, such as Dingle Bay, Kenmare River, and Bantry Bay, penetrate far inland between mountainous peninsulas, sometimes affording sheltered harbours, such as Bere Haven.

The highest summits in the island are Macgillicuddy's Reeks, which rise to a height of 3400 feet among the mists of the Atlantic, and have the picturesque wood-girt lakes of Killarney lying at their feet.

The line of the Kerry and Cork Mountains is continued eastwards in the Knockmealdown Mountains, north and east of which extend the wide lowlands of the Upper Suir and the Golden Vale of Tipperary. Near to the mouth of the Suir, and forming the main outlet for the fertile valleys of this region, lies Waterford, a packet-station. It is now superseded for passenger traffic by Rosslare, the port for the new express route to Fishguard in South Wales.

The county of Wicklow is occupied by a great group of granite mountains, resembling the mountains of North Wales. They bear many traces of glaciation, and are intersected by deep valleys, and contain beautiful tarns.

The Northern Mountains.—To the north-east of Ireland the mountains are of volcanic origin, the lava-capped plateau of Antrim marking a continuation of the lava flows of the Inner Hebrides of Scotland. The appearance of the Giant's Causeway, which looks like a series of broken vertical pillars, is due to the fact that the basalt, which must once have flowed over the land like lava, shrank and cracked as it cooled.

The mountains of the north-west are of very old rock, granite in the main, and afford magnificent mountain and coast scenery. Much of this region is infertile and poor, especially the boggy mountains of Connemara.

A DESCRIPTIVE GEOGRAPHY OF THE BRITISH ISLES

I.—INTRODUCTORY

The Temperature of the British Isles

THE sun is the predominating influence which determines the annual distribution of the temperature over the British Isles. The annual isotherms run approximately east and west, with one or two important modifications. From Southampton north through the central districts of England the distances between each successive isothermal do not differ greatly from each other, but there is a greater distance in Scotland between the isothermal of 48° and 47° Fahr. The greatest differences of distance between the isothermals are where they are cut by the line of longitude 4° W. This is the degree of longitude which passes through those districts which offer the strongest contrasts in the distribution of land and water. The disturbances here referred to, as shown by the isothermals, point to another influence—viz., that of the ocean, which, next to that of the sun, most powerfully affects the British Isles.

Monach, in the Western Hebrides, and Scilly, in the British Isles, have strictly insular climates comparable with each other. The mean annual temperature at sea-level of Monach is 47·5°, and of Scilly 52·6°. The difference is thus 5·1°, and since the difference in latitude is 7° 31′, the rate at which the temperature falls from Scilly northwards is

1° Fahr. for 90 geographical miles. Lairg, in the centre of Sutherlandshire, and Salisbury, Wilts, may be taken as representing the most northern and southern land stations. The mean temperatures at sea-level are respectively 46·4° and 50°, the difference being 3·6°; and since the difference in latitude of the two places is 6° 57′, the rate at which the mean temperature rises from Lairg southward is 1° for 116 geographical miles.

Since the prevailing winds of the British Isles are west-south-westerly, it follows that the influence of the ocean on the temperature of the air is much greater in the west than in the east. The mean temperature is everywhere greater on the west than on the east coasts; and while on the west the temperature of the sea is about 3° higher than that of the air, on the east it is 1°. Further, the prevailing winds over St. George's Channel and the Irish Sea assume a more southerly direction than elsewhere, resulting in the remarkable curving northwards of the isothermals over the coasts and islands of these seas.

But it is in the winter months that the beneficial influence of the ocean is most strikingly apparent in maintaining a temperature very greatly in excess of what is due to mere latitude and season; and this influence is the more decided just in proportion as the locality is surrounded or enveloped by the warm waters of the Atlantic. But for the ameliorating influence of the Atlantic spread over these islands by the prevailing west-south-westerly winds, the mean temperature of London in the middle of winter would be 15°, of Edinburgh 8°, and of Shetland 4°. Hence but for the warmth derived from the Atlantic, the winter of London would resemble that now experienced in the north-west of Iceland, and the winter of Edinburgh would rival in severity that of the south of Greenland.

The mildest winter climates are found on the south-west of England and of Ireland, where the mean temperature in January is 6° higher than that of London. Where a winter climate is sought offering in the highest degree anywhere afforded by the British Isles the combined qualities of mildness and dryness, such a climate is to be found on the shores of the Channel from about Dover to Portland.

The influence of the land in lowering the temperature in winter is most strikingly seen in the case of Ireland, which is more completely bathed in the warm waters of the Atlantic than Great Britain. In Ireland the lowest temperature is in the north-east or lee side, so to speak, of the island, and from this central space, the mean of which in January does not exceed 40°, temperature rises all round, but especially towards the south-west, on advancing in which direction it rises successively to nearly 45°.

The temperature of the sea falls to its annual minimum in March. But in inland situations the temperature of the air in the same month has already risen several degrees above the annual minimum. At Greenwich, for example, the temperature of March is 4·7° higher than that of January. In situations open to the ocean the temperature of the air in March is but little in advance of that of January. Thus in Scilly it is only 0·5° higher, and at Holyhead 1·2°, whilst at Dunrossness, North Unst, and Monach it is 0·8° lower.

It is in April that the isothermals make the nearest approach to straight lines, not deviating greatly from an east and west direction. But even in this month there is seen the depressing influence of the Irish and North Seas on the one hand, and the elevating influence of the land on the other, on the temperature of the warmer months.

The highest summer temperature occurs in the valley of the Thames, around London, in the district enclosed within the isothermal of 63° or 64°. The highest mean temperatures in July, after allowing for height, are Camden Town, 64·4°, and Greenwich, 64·3°, and a large number of places in the vicinity of London have a July temperature of about 64°. This, then, is the part of the British Isles where the summer heat is greatest, and it is here that many flowers and fruits can be brought to greatest perfection.

From its complete insular position, the Isle of Man offers great advantages for the coolness of its summer climate and for its mild winters, advantages all the more marked because nowhere in the island is the rainfall excessive. Rothesay and other watering-places on the Firth of Clyde also have desirable climates, characterized by cool summers and mild winters; but the rainfall there is heavier than on the South Coast and in the Isle of Man.

A third important element in determining the temperature is height above the sea, the effect of which, as regards the British Islands, is a lowering of the mean temperature at the rate of about 1° for every 270 feet of elevation. The great attraction of the summer climate of the Scottish Highlands is its comparative coolness, which becomes all the greater the higher we ascend. As compared with London, the temperature of Braemar is about 9° lower during the summer months from June to September, and 7·5° in October, with evenings and nights proportionately colder than the days.

The isothermals of September closely resemble those of April in approaching to straight lines running, roughly speaking, east and west, the chief difference being that, whereas in April the lines slant from west-north-west to east-south-east, in September the slant is rather from west-south-west to east north-east. The isothermals of October may be regarded as transitional from summer to winter. In November the isothermals exhibit a still closer approach to those of the winter months.

Dr. Alex Buchan.—An article (abridged) in *Journal of School Geography*, vol. ii., 1898.

By permission of Mr. John Buchan.

Rainfall of England and Wales

The climate of England and Wales is influenced to a considerable extent by the configuration of the land, and this effect is most marked in the case of rainfall. Moisture-laden wind may blow over a level expanse of country and produce little precipitation; but when it encounters a slope, and is forced to rise into the cooler regions of the upper air, condensation increases rapidly, and to a considerable extent the rainfall of the land increases with its altitude. The effect is, however, probably due to slope as well as to height, a steep hill causing the air to ascend for some time after the summit is passed, and so producing the maximum fall of rain a little distance beyond the summit on the leeward side. On account of this relationship, and because of the shelter afforded by a mass of high land to a plain to leeward, the rainfall map of England and Wales, while it corresponds very closely to the map of vertical relief, resembles a blurred impression. The famous centre of high rainfall at The Stye and Seathwaite, in the Lake District, and the scarcely less wet valleys on the east of Snowdon, owe their character for intense wetness to this fact. The highest average rainfall occurs in the mountains of Wales, the Lake District, the Cheviots, and the Pennine Range, and to a less marked degree on the high moors of Cornwall and Devon, and along the lines of the Cotswold and Chiltern Hills, the Chalk Downs, and the Wolds of Lincoln and York.

A narrow zone of low rainfall borders the coast on the west as well as on the east, and whenever a plain stretches inland it forms a region of low rainfall. Even a comparatively narrow valley running up amongst hills maintains a lower rainfall along its floor than prevails on the bordering heights. Shelter also plays its part, and all causes conspire to make the driest region of England the inland portion of the low Eastern Plain which extends from the Humber to the Thames. The great dry area of England stretches westward to the Severn Valley, and it is surprising to find how low a mean annual rainfall prevails close under the Welsh mountains, which drain the sea wind of its moisture. It sometimes appears that the rainfall begins to diminish with altitude after a certain height above sea-level is passed; but it is more likely that the exposed position of the raingauges on high hill-sides causes increased loss of rain on account of eddies set up by the wind above the gauge.

Dr. H. R. Mill.—*Geographical Journal*, December, 1904
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Effect of Temperature on Soil

Of all the influences brought to bear on vegetable life by the atmosphere, that of temperature is the most powerful and far-reaching. Not only are plants affected by changes of temperature above ground, but its influence upon their roots is in most cases even more clearly to be traced.

Knowing as we do how the atmosphere receives its warmth, not only from the direct influence of the sun, but from the heat it obtains from the ground, it will be readily understood how greatly the surface soil, particularly uncropped soil, becomes heated above that of the air. It is, however, not only the surface soil which becomes heated, for the warmth thus obtained descends to a considerable depth in the ground; so that the subsoil in this way becomes a storehouse of heat for plants to draw upon during the comparatively sunless period of the year, while it likewise serves by its lower temperature to keep their roots from becoming unduly stimulated during the summer months.

At 1 foot deep a *clay* soil—taking the year as a whole—is rather colder than the air; a *sandy* soil decidedly warmer; while a *chalk* soil is generally about the same temperature as the air. At 4 feet deep the ground is in all three cases cooler than the air during the period when most plants are in active growth (April to August), and warmer during the remaining seven months These differences are greatest with a chalk soil, less with a clay soil, and least with a sandy soil.

The greater the depth below the surface, the more slowly are the changes above ground felt. For instance, taking 1 foot deep as representing the soil and 4 feet deep the subsoil, the former, like the air, is warmest in July; whereas at the depth of 4 feet the warmest month is August.

It was found by Dr. Buchan, when discussing the temperatures of light and heavy soils, "that light soils are subject to a greater degree of frost near the surface than strong clay soils, but that frosts do not penetrate so far down into light soils as into strong clay soils, the explanation being that light loose soils are worse conductors of heat than strong, clayey, compact soils."

> ED. MAWLEY, F.R.H.S.—"Weather Influences on Farm and Garden Crops." *Quarterly Journal of Royal Meteorological Society*, vol. xxiv.

Movement of the Tidal Waters

More important than the hour of high-water, and perhaps than the amount of rise and fall, are the alternating tidal currents, which, to the great advantage of commerce, affect all the British seas. While the water is rising at Liverpool and at Dover, currents set inward up the North, the St. George's, and the English Channels, running with a speed of from one to three miles an hour, occasionally racing at six miles an hour round such promontories as Holyhead and Portland Bill, but nowhere approaching the rapidity of the inset through Pentland Firth. When the water is falling at Liverpool and Dover the currents are generally outward, but, owing to local interferences, the inward and outward sets are not precisely converse.

Twice a day the tides convert the lower reaches of most British rivers into arms of the sea. The estuaries are generally so shaped as to concentrate the tidal energy on a steadily narrowing front, with the effect of magnifying the tidal rise and fall for some distance inland. In the Severn, for instance, at the mouth of the Bristol Avon, there is a difference of 40 feet between the levels of high and low water at the time of spring tides. In some instances this action is so marked as to produce a crest-fronted wave, known as "the bore" on the Severn, and as "the eagre" on the Trent. At Liverpool is a reverse condition : the estuary of the Mersey is bottle-shaped, with the consequence that strong currents flow through the entry, conveying the large quantity of water needed to fill the upper basin. These currents scour the channel between Liverpool and Birkenhead, keeping it relatively deep. The conditions at Portsmouth are somewhat similar.

The tidal currents, being periodically reversed, have little effect upon the shores when acting alone ; it is only when reinforcing or neutralizing other currents, or the drift of breaking waves, that they accumulate great changes. When the flood runs up a river channel, it is partially counteracted by the outflowing stream, but the ebb acts with the stream, producing results which are not effaced by the flood, and, owing to the greater head of water, of more importance than could have been achieved by the unaided stream. Similarly, in the English Channel the flood-current, acting with breakers which impinge upon the shore obliquely from the south-west, causes an along-shore drift of beach-shingle, which is not compensated, after the turn of the tide, by the current running counter to the waves. Moreover, subsequent waves from the east or south-east do not produce a complementary balance of westward drift—partly for the reason that east winds are less frequent than west winds, but chiefly because the short waves originated in the narrow seas have neither so powerful nor so deep-reaching an influence as the long swell from the Atlantic storms.

The outline of the south coast of England is doubtless partially due to this persistent eastward drift of the coastal débris. The Lizard, Start Point, Portland Bill, St. Catherine's Point, and Beachy Head, are isolated masses of unusually resistant rock or the seaward ends of belts of such rock. Separated by these headlands are a succession of wide bays, shaped by the scour of the dominating current and surf.

While the points have been abraded from the salient portions of the coast, shingle bars, such as the Chesil Beach, west of Portland Bill, have closed the minor inlets, and thus contributed to the even sweep of the shore-lines. Dungeness is a shingle spit, the material for which has been drifted eastward from the cliffs at Hastings.

In addition to the tidal movements, there is a complicated circulation of the waters round Britain, due to differences of salinity and temperature, and to the pressure of the prevalent winds.

The migrations of fish are in large measure governed by the fluctuation of the currents. Herrings, perhaps seeking the oxygenated water drawn from the Atlantic, forsake the Norwegian coasts in the spring-time, when the cold river water begins to mingle with the sea beyond the Skager Rak. On the other hand, they appear in great shoals off the Scottish coast precisely when the oceanic water, bearing supplies of food, creeps southward from the entry between the Orkney and Shetland Islands.

Flat-fish have a still more notable relation to the currents. Myriads of the eggs of plaice, for instance, floating upon the surface, are carried, whilst slowly hatching, from the west to the east side of the North Sea. As a consequence, young plaice abound off the Danish, German, and Dutch coasts. In the spring and summer, when the river water comes down, they migrate along the bottom to a greater distance from the shore, and in the winter a certain number reach the Dogger Bank, but the rest, as appears from the recatching of marked fish, return towards the Continental shores. In some seasons, from unknown causes, haddock come to the Dogger in great numbers, and starve the plaice by taking their food.

H. J. MACKINDER. *Britain and the British Seas.* The Clarendon Press, 1907.

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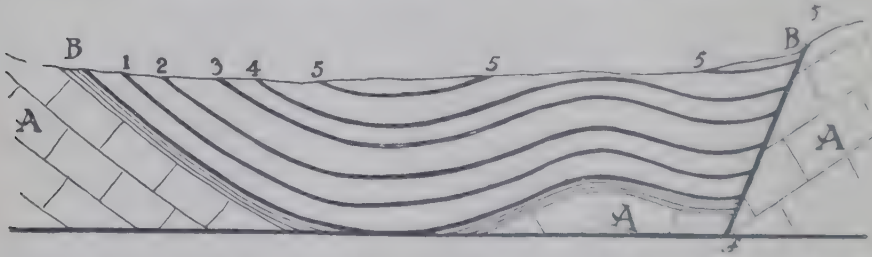
Our Coal-Supply

The coal-fields of our island occur under two conditions: some are "visible," others are "concealed." In the case of the former the coal-bearing strata appear at the actual surface: we can traverse them in all directions, and their actual extent and thickness can be readily measured. They occur mainly in the form of basins more or less irregular in shape, the strata being arranged like a series of saucers, one within another. The accompanying illustration gives a diagrammatic representation of the principal features in the structure or build of such a coal-field. To the left it will be observed that the coal-bearing beds crop out at the surface, while to the right they do not, but are cut off in that direction by a "fault" or dislocation, *f*.



Not a few of our coal-basins are in this way bounded on one or more sides by great dislocations. At first sight it seems unfortunate that this should be the case. One is apt to suppose that but for these interrupting faults the coal-bearing strata must have extended over wider areas. Nor, indeed, can it be doubted that our coal fields did at one time spread over enormous tracts, from which they have since vanished. We have good reason to believe that all, or nearly all, our now detached areas of coal-bearing beds were formerly continuous. In that stage of their existence the deposits occupied approximately horizontal positions. Eventually, owing to movements of the earth's crust, the strata were subject to compression, with the result that they were thrown into a series of broad undulations; while in many places faults or dislocations appeared, by which the continuity of the strata was interrupted. It can be shown that since the time of those earth movements our land has been subjected to the protracted process of "denudation," whereby a thickness of many thousands of feet of rock of all kinds has been gradually removed from the surface of the country. Had it not been for the earth movements referred to, it is quite certain that our coal-fields would have been much less extensive than they are, if, indeed, any portion of them could have survived. But, owing to the folding of the crust, they have been preserved in the deep hollows and basins thus formed, or dropped down by faults amongst rocks older than themselves; while from the top of the undulations or broad ridges the strata with which they were formerly continuous have been swept away.

The extent and structure of those basins are now well known, and the number of workable coal-seams has long been ascertained. Experience has shown that coal-seams are usually very persistent, occurring often enough throughout the whole extent of a coal-field. There are, of course, many exceptions, but persistency is the rule, and it is this circumstance that makes coal-mining a more reliable investment than load-mining. So far, then, as regards our "visible" coal-fields, it need not be doubted that an approximately accurate estimate of their contents is possible.

It is still a moot question whether any concealed coal-bearing strata occur within the wide regions occupied by the Cretaceous and Tertiary deposits of Eastern England. But several bore-holes which have been put down here and there in the regions referred to, after passing through the chalk, have struck strata older than our coal-measures. Geologists therefore hold out very little hope of discovering new stores of coal in that quarter. As regards South-East England, coal, we all know, has been discovered in Kent, and it would appear that from Dover to Bath there in all probability extends a narrow trough of coal-measures from which supplies of fuel will yet be obtained. But until the actual extent and richness of the coal-field of South-East England has been determined, it would be idle to attempt any estimate of its available supplies.

The depth of 4000 feet was adopted by the Commission[1] as the limit at which coal could be worked. The rate at which underground temperature increases is somewhat irregular; it is a progressive, but not a uniform increase. The average rate has usually been taken as 1° Fahr. for every 55 or 60 feet of descent below the "invariable stratum"; that is, the level to which the influence of the changes of the seasons extends. In England that stratum occurs at a depth of 50 feet or so, and has a temperature of 52° or thereabout. Of late years the methods of measuring the downward increment of heat have been greatly improved, and recent observations lead to the conclusion that the average rate of increase may be taken as 1° for every 60 feet of descent. In a notable boring put down by the Prussian Government at Parnschowitz, near Rybnik, in Silesia, to a depth of 6570 feet (the greatest depth to which inquisitive man has yet penetrated), the rise of temperature was 1° for every 62·1 feet. If, therefore, we take the results of this great boring, in which the most improved methods of measurement were employed, to be a close approximation to the truth, we may infer that the temperature at a depth of 4000 feet in the British coal-fields will reach 115°. So long as the air is dry men can work in an even hotter atmosphere, but it is otherwise if the air be saturated with water vapour. In the moist atmosphere of the St. Gothard Tunnel a temperature of 90° was considered to constitute the limit for men.

As regards the depth at which coal may yet be worked, it is interesting to note that even in our own day fossil fuel is being obtained at very considerable depths. At Pendleton Colliery, near Manchester, it is won at a depth of nearly 3000 feet. Again, at Mons, in Belgium, one of the collieries is over 3900 feet deep. From what has now been advanced we may conclude that mining operations in our coal-fields need not be limited to a depth of 4000 feet.

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[1] A Royal Commission was appointed in 1866 to inquire into the amount of our coal-supply and its probable duration.

In the following statement we have in round numbers the sum of our available coal-supply :

In our "visible" coal-fields, down to a depth of 4000 feet	58,000,000,000 tons
In same coal-fields, between 4000 and 6000 feet	6,000,000,000 ,,
In our "concealed" coal-fields, down to a depth of 4000 feet	24,000,000,000 ,,
In same coal-fields, between 4000 and 6000 feet, probably much more than	8,000,000,000 ,,
Total	96,000,000,000 ,,

Abridged from an article by JAMES GEIKIE, F.R.S., Professor of Geology in the University of Edinburgh, in *Pall Mall Magazine*, June, 1901.

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Roman Towns in Britain

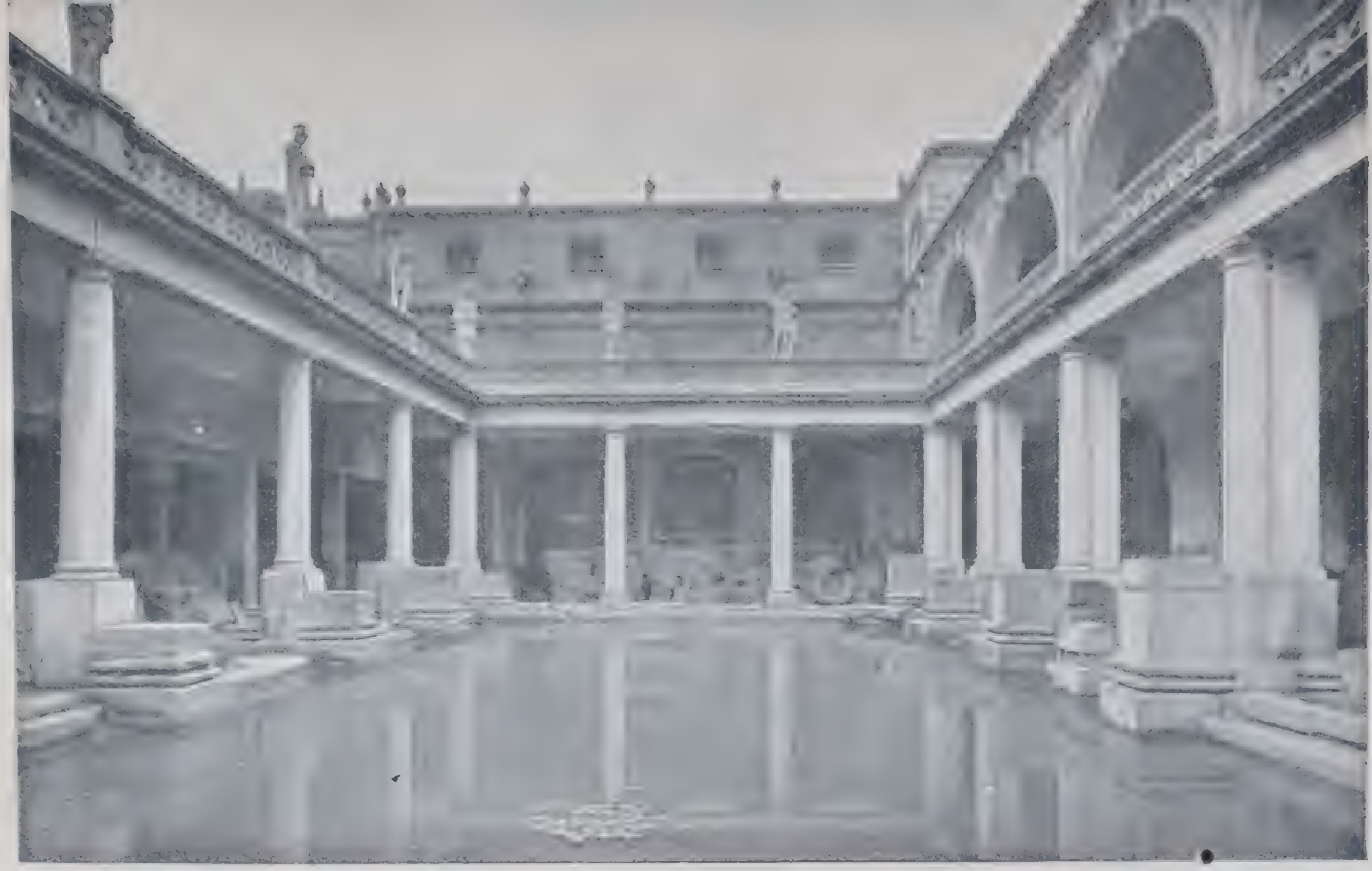
Much of the geographical interest attaching to the history of Roman towns arises from the hints we get therefrom as to the geographical conditions that may have favoured their existence in the situation where they are found or formerly existed. Where Roman towns have continued to exist, or have been restored on the site originally occupied or on a site closely adjoining, there is at least a presumption that their existence on these sites is due to geographical conditions of an enduring kind. Where Roman towns have passed away and left no modern representative, the inference is that, if their existence could ever be fairly ascribed to geographical conditions, these conditions have changed.

Among Roman towns or stations that have continued to exist or have been revived, it is natural to find a considerable number of seaports, including river-ports accessible to sea-going ships. Among these may be mentioned Londinium (London), Durobrivæ (Rochester), Dubræ (Dover), Clausentum (Southampton), Isca (Exeter), Glevum (Gloucester), Segontium (Carnarvon), Deva (Chester), Pons Ælii (Newcastle), Eburacum (York), Venta Icenorum (Norwich), and Camulodunum (Colchester). To these we may add Aquæ Sulis (Bath), which, though it has long ceased to be a seaport, in all probability served all the purposes of a port for this district in Roman times when no Bristol existed, and Luguvallium (Carlisle), which continued to be a seaport down to comparatively recent times.

Of the towns mentioned, Clausentum and Venta Icenorum do not appear to have occupied the exact site of their modern representatives, and the difference in situation, slight as it is in both cases, is not without interest. The exact site of the Roman Clausentum is now occupied by the village of Bitterne, at the head, but on the east side, of the small estuary of the Itchen. A point at this spot would be the highest point that sea-going ships could reach on their way to Winchester, then the principal goal in this region As traffic increased, the more extensive accommodation for loading and unloading on the peninsula between the Itchen and the Test would give greater advantages to that site. Venta Icenorum appears to have occupied the site of the modern village of Caistor, which lies a little to the south of Norwich, on a small river called the Tese, probably navigable to this point in Roman times, and would be the first navigable point reached in following the road to the Yare from the south.

Portus Adurni (? Porchester), Tamara (near Tamerton, on the Plym), and Gariannonum (Burgh Castle, on the Yare), may also be mentioned as having their modern representatives as seaports at some little distance from the ancient towns. Whether Porchester is to be identified with Portus Adurni or not, its name seems clearly to indicate the presence of some Roman port here. It is now represented by Portsmouth, the foundation of which is ascribed by Camden to the removal of the inhabitants from Porchester to the island of Portsea, in consequence of the "gradual withdrawing of the sea." At no period, however, can the harbour on which these ports stand have had anything like the commercial importance of Southampton, which is much better situated for communication with the interior, and does not suffer from the disadvantage of the strongly flowing and ebbing tides, which at times render the navigation of the entrance to the other port extremely difficult. The commodiousness of the harbour as a naval station is the main cause of the importance of Portsmouth. Modern railway facilities were required to give it the commercial value which it now also possesses. Tamara, now represented by Plymouth, owes its displacement as a seaport to the increased size of vessels. When smaller sea going vessels were in use, it was, of course, important that they should penetrate as far inland as possible. The displacement of Gariannonum, now represented by Yarmouth, is, on the other hand, probably due to a change in the coast-line. In Roman times the present site of Burgh Castle appears to have been at the mouth of the Yare. Yarmouth, which dates from Saxon times, stands on a spit of blown sand, which holds back recent alluvium of the Yare and Bure.

Among Roman ports which have not survived, at least as such, may be mentioned Portus Lemanis (Lympne), Regulbium (Reculver), and Rutupiæ (Richborough), both of which have lost their importance through the alluvial deposits, which have filled up the Wantsum and the mouth of the Stour; Anderida (Pevensey), which has also been cut off from the sea by alluvial deposits; Regnum (Chichester); Branodunum (Brancaster); and Vainona (Wainfleet). Whether Regnum is, strictly speaking, to be included among the Roman seaports of Britain is perhaps doubtful. No doubt part of its importance was due to the fact that boats of light draught can navigate Chichester harbour (the inlet to the east of Hayling Island); but it does not follow that they could reach the site of the city itself. Of Roman towns that stood on navigable rivers, the following may be mentioned as still retaining some of their ancient importance: Durovernum (Canterbury), Cæsaromagus (Chelmsford), Camboritum (Granchester, the predecessor of Cambridge), Durolipons (Godmanchester, opposite Huntingdon), Ratæ (Leicester), Lindum (Lincoln), Danum (Doncaster), Legiolium (Castleford), Calcaria (Tadcaster). Most of these were probably either at the head of navigation on the rivers on which they stand or at fords, or both. The Stour was navigable to Canterbury down to comparatively recent times. The name of Cambridge, and that of its ancient representative, show that the bridge across the river here was preceded by a ford, *ritum* being the Latinized form of the Welsh *rhyd*, "a ford." Leicester was long at the head of navigation of the Soar, the navigation being now continued beyond the town by canal. Tadcaster is still the head of navigation on the Wharfe. The importance of Lincoln as, on account of its position at a well-marked break in the Lincolnshire limestone, a point of convergence of roads has often been remarked on. In Roman times, and for many hundreds of years afterwards, it was perhaps quite as important as a meeting-place of waterways. The Witham below Lincoln is still a waterway to the Wash for boats of 5-feet draught, and this line is continued west of Lincoln to the Trent at Torksey by the Foss dyke. The remaining Roman towns that it may be interesting to consider are best notified in connection with the great Roman roads. The great north-west road is that which came to be known as Watling Street. If we take it as beginning at Dover or Richborough, it passed by Canterbury and Rochester to London, then by Sulloniacæ (Brockley Hill), Verulanium (St. Albans), thence to the south point of the modern county of Leicester, from which point it forms the whole of the south-west boundary of that county (the only county boundary in England composed of nearly mathematically straight lines). On leaving Leicestershire it first continues in a north-westerly, then in a westerly, direction to the north of the ancient forests



Photochrom Co., Ltd.

BATH : THE RESTORED ROMAN BATH.

between the Avon and the Severn, passing Letocetum (Wall), Pennocrucium (Penkridge), and touching the Severn at Uriconium (Wroxeter). From that point it probably ran north to Chester.

This Roman road was crossed by another called the Fosse Way, running from south-west to north-east. It no doubt branched off from some point on the great south-western road to Exeter, but only begins to be traced in the neighbourhood of Ilchester, whence it passed north-east to Aquæ Sulis (Bath), Corinium (Cirencester), and that point in the south-west boundary of Leicestershire where a slight change is made in the direction of that boundary. At this point it crosses Watling Street, and beyond that road its north-easterly direction was continued by Leicester to Lincoln.

On the Fosse Way the only Roman towns beside Lincoln which have retained any importance are Bath, Cirencester, and Leicester. Bath still derives importance from the hot springs, to which it owes its present, as it owed its Roman, name, and by which in ancient times it gained celebrity. Cirencester, though still a town with several thousand inhabitants, no longer has the relative importance which it must have had in Roman times, when it was the point of convergence of several important roads, the Fosse Way being here crossed by the road from Silchester to Gloucester. It was probably the fact of the Soar navigation ending here that determined the revival of Leicester on its ancient Roman site. Dr. Guest contends that the southern portion of the Ermine Street, or great north road leading out of London, was not of Roman construction. If Dr. Guest is correct, we may conclude that the alluvium of the Lee, and the forests on both sides of that river, presented obstacles in the way of road-making which it was not worth while to overcome under the conditions then obtaining.

Geo. C. Chisholm.—"Distribution of Towns and Villages in England," *Geographical Journal*, November, 1897.

By permission of the Royal Geographical Society.

II.—SCOTLAND

(*a*) GENERAL

The Races of Scotland: Influence of Physical Features upon the People

THE fundamental distinction between highlands and lowlands has had a powerful effect on the wanderings and ultimate groupings of the different races of mankind. Nowhere can the influence of this topographical contrast be better observed than in Scotland. The Scottish Highlands, sharply defined against the Lowland plains, and washed around their other sides by the stormy Atlantic Ocean, offered in rude times a wild and almost inaccessible asylum against invasion. There the original Gaelic population has been able to maintain itself, while wave after wave of hostile immigrants has broken against the bases of the hills. The Cymri, who came after the Gaels, possessed themselves of the southern part of the country, but they do not seem ever to have advanced beyond the limits of their Strathclyde territories. The Romans carried their conquests up to the borders of the Highlands, but there was nothing among those dark mountains to invite them farther. They marched into the northern wilds, indeed, but it was rather for vainglory and to punish their savage assailants than with a view of permanent occupation; and so, tracing their wall, and planting their forts across the narrowest part of the island, they were content to let the Highlanders keep their fastnesses.

When the next wave of conquest brought successive hordes of Norsemen and Danes from beyond the sea to our shores, the same physical features which had guided and limited the march of the southern invaders once more set bounds to the progress of the Vikings from the north.

The lowlands of the northern counties and of the Midland Valley lay open to the war-boats of the pirates, and there, driving out or absorbing the Celtic population, the Teutons firmly planted themselves. But they never pushed their way far into the mountains. Down to this day, in spite of the slow but increasing diffusion and amalgamation of the races, the geological boundary between the rough ground of the crystalline schists on the one hand and the drift-covered plains of the Moray Firth on the other is still in great measure the boundary of the Gaelic-speaking and English-speaking populations. On these fertile lowlands we hear only English spoken, often with a northern accent, or with some northern words that seem to remind us of the Norse blood which flows in the veins of the hardy fisherfolk and farmers. We there come upon groups of villages and towns. The houses, though often poor and dirty, are for the most part solidly built of hewn stone and mortar, with well-made roofs of thatch, tile, slate, or flagstone. The fuel in ordinary use is coal, brought by sea from the south.

But no sooner do we advance within the Highland districts of the crystalline schists than all the human associations of the ground, as well as its physical aspect, appear changed.

Gaelic, though slowly dying out, is still over wide regions the vernacular tongue. There are few or no villages. The contrast of geological structure and scenery, which allowed the Teuton invaders to drive the older Celtic peoples from the coast-line, but prevented them from advancing inland, has sufficed during all the subsequent centuries to keep the two races apart.

When the Norsemen sailed down the western coast they found in it the counterpart of their Scandinavian home—

the same type of bare, rocky, island fringed shores, sweeping up into black mountains, winding into long fjords beneath the shadow of sombre pine forests, and to the west the familiar sweep of the same wide blue ocean.

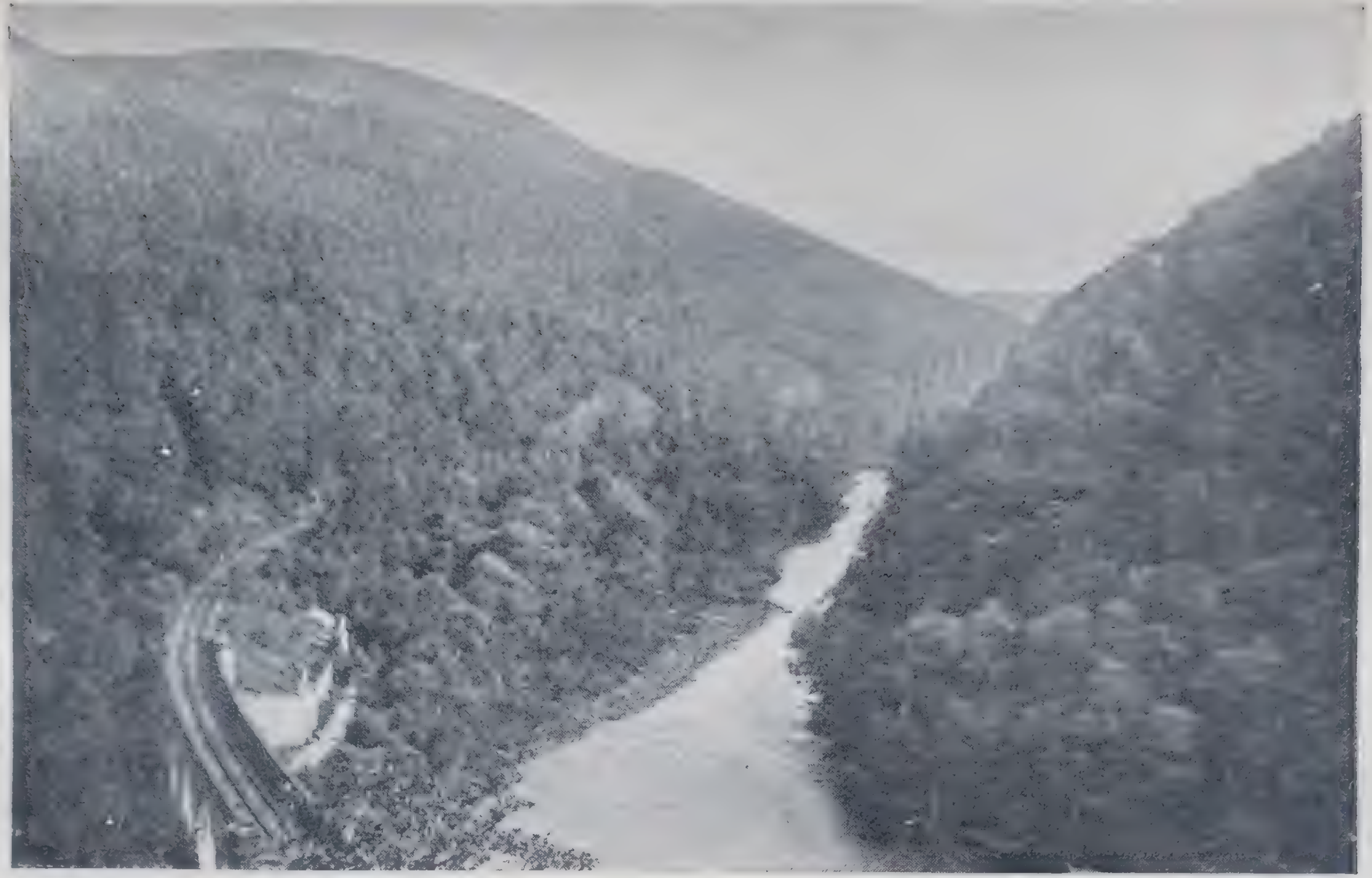
The effect of this peculiar configuration, so different from that of the east coast, is curiously marked in the history of the Scandinavian colonization. Masters of the sea, the Norse Vikings possessed themselves of the Shetland, Orkney, and Western Islands. They likewise held the western seaboard of the mainland. But the want of any continuous selvage of low ground down that coast made it difficult for them to plant there a continuous line of settlements. Only by sea could communication be kept up between the scattered communities. The Norsemen of the west, therefore, remained to the end Vikings—baysmen—familiar with every creek and headland, but never permanently settling in the hilly interior, where the Celtic dalesmen and hardy mountaineers held the ground. Hence, when at last the political connection between Western Scotland and Norway was severed, the Norse population, no longer recruited from its mother-country, and hemmed in upon the sea by the near background of mountains, could not maintain its individuality. It was gradually absorbed into the far more abundant Celtic population, which came down again from the interior to the coast. Though the Norsemen held possession of these western tracts for so many centuries, hardly any trace of their former presence is to be detected, save in the blue eyes and fair hair of many a Western Highlander, and in the Scandinavian names which still cling to promontory and bay. The relative limits within which the two races dwelt may even yet be approximately traced by the topographical names. Among the islands and along the mere edge of the mainland abundant Scandinavian words—nishes, nesses, ays, fords, wicks, and many more—remain to remind us of the sea-rovers who brought them. It is in the Orkney and Shetland group, which were farther from the main mass of the Celtic population, and were longer and more completely under Scandinavian rule, that the traces of the Vikings are most strongly imprinted upon the physical frame and language of the people. To this day a Shetlander speaks of going to Scotland, meaning the mainland.

Sir A. Geikie.—*The Scenery of Scotland.* Macmillan and Co.
By permission of Messrs. Macmillan.

The Influence of Scenery

Geographically the mainland of Scotland may be divided into three great divisions—the Highlands, the Southern Uplands, and the Midland Valley—each being characterized by a scenic aspect of its own, which, as we shall see, is intimately connected with its geological structure. Further, it may be pointed out that the scenery, and ultimately the land and soil upon which we live, have been the principal factors in moulding our character as a nation; and for this reason alone, if for no other, Scotsmen ought to take an intelligent interest in the structure of their native land. How truly, for instance, it may be said of Glasgow, our great commercial capital, that it is a "dark, sea-born city"! Had the great estuary of the Clyde not been designed and sculptured out in bygone geological ages, and had the immense stores of iron and coal not been laid up in the rocks beneath, this great city could never have existed where it now stands; nor is it likely that a great genius like Watt, whose invention was to knit together the ends of the earth, would ever have arisen except in a country which seems to have been specially designed to call forth and foster such powers.

In a similar way our intellectual and spiritual life may be considered to be, to a great extent, the product of the scenery that surrounds us. Had it not been for the existence of thick masses of grit, intercalated in the Highland schists, we could not have had that wild and rugged scenery



Valentine and Sons, Ltd.

THE PASS OF KILLIECRANKIE.

which is characteristic of Ben Ledi, Ben Vorlich, Ben A'an, Ben Venue, Loch Katrine, and the surrounding lake district, which inspired Sir Walter Scott, and round which he has thrown a halo of romance, which has made that part of Scotland a veritable Mecca for the English-speaking race. Again, where but amid the lonely mountains of the Scottish Highlands could we have expected the dreamy, ghost-like strains of Ossian to have found their birth? Where else could they have been nursed except beneath the shadows of great mountains and amid the murmurings of pine forests?

Numerous other examples might be cited of the bearing and influence of the geological structure of the country upon its national history, but it is unnecessary that they should be multiplied here. Still, we must not pass over our greatest national feature—namely, our independence, and the manner in which we have preserved it against all assailants. A glance at a geological map will show how much we have been dependent upon the physical configuration of our country for this success, for the map will at once reveal that the different rocks which enter into the formation of our country are arranged in more or less parallel bands, some of them rising into hilly or mountainous masses, whilst others sink into plains or valleys, thus forming a series of ramparts or trenches, from which our southern invaders more than once forced us step by step, only to find us return again. Behind all we had the grand rampart of the Highlands, with its great mountains, deep valleys, and sea-locks. Into these even the Roman eagle could not penetrate, the conquerors having to content themselves by building walls and towers to fence off the fierce tribes. There cannot be the least doubt, then, that we owe much of our national character to that peculiar geological structure which has shut out this mountainous land from all intercourse with our southern neighbours.

PETER MACNAIR. *The Geology and Scenery of the Grampians.* Maclehose, 1908.

By permission of Messrs. Maclehose.

The Scottish Peat-Mosses

The present distribution of peat deposits in the British Isles shows a general tendency to follow the maximum rainfall, the deposits being comparatively scanty on the eastern side of England and Scotland, and increasing in area and in thickness as the western coasts are approached, the greater development occurring in the Hebrides, the western part of the Scottish mainland, and the West of Ireland. In the hill districts they reach their greatest development upon smooth, flat-topped hills like the Pennine Chain in England, the elevated plateau of the Grampian Mountains, and in elevated districts surrounded by mountains such as the Moor of Rannoch in the West of Scotland. Yet if the peat in such districts is examined, it is found that there are traces everywhere showing that the present conditions are not sufficiently moist to favour peat growth, for the hilltop, hillside, and upland valley peat, almost without exception, is in a state of rapid denudation, being traversed by channels and furrows often 12 or 15 feet in depth. From large areas, indeed, it has been entirely removed, the edges of the denuded peat forming dark crumbling banks, which are being constantly washed away by every heavy rainfall. If the sides of these gullies are examined, the stems and roots of large trees are often seen exposed as the bank is gradually cut back by the stream at its base. Where the peat is deep, and the stream has cut its way down to the underlying soil, it becomes evident that the tree roots and stems are arranged in a definite layer. Sometimes one, more frequently two, and occasionally three, such forest layers can be recognized, separated by thick beds of peat quite free from any traces of trees.

These forest remains are frequently present in the peat in districts where no trees will grow at the present day; to take but two instances, forest remains are abundant in the peat of the now almost treeless Outer Hebrides, and on the summits of the Grampians at more than 3000 feet above sea-level. The great thickness of many of our peat deposits (sometimes reaching 30 to 50 feet), the known slow rate of growth of peat, and the frequent presence of two forest zones, is evidence that the conditions have changed considerably since the mosses began to form, and a closer examination has shown that large areas of peat in Britain date back to the later phases of the Glacial Period.

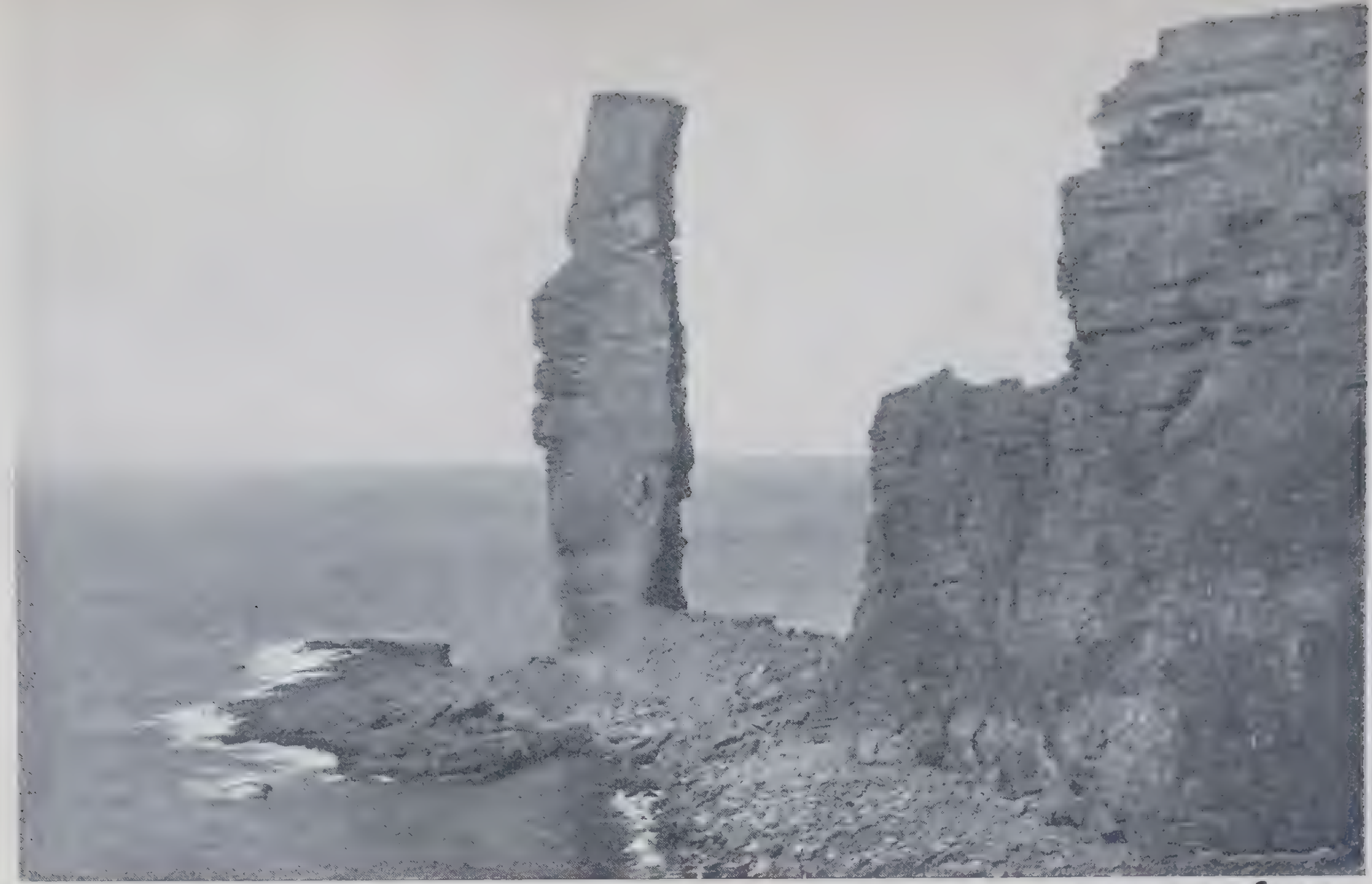
From a paper by FRANCIS J. LEWIS, F.L.S., in the *Scottish Geological Magazine*, May, 1906.

By permission of the Royal Scottish Geographical Society.

(*b*) THE HIGHLANDS

Highland Scenery

In the northern parts of Wales, where a group of ancient volcanic rocks has been laid bare by the stupendous denudation of the surface, a small tract of truly Highland scenery has been carved out in Cader Idris, Arenig, Snowdon, and the surrounding heights in Carnarvonshire and Merionethshire. Another isolated area of volcanic hills forms the picturesque district of the Lakes. But it is in Scotland that this type is displayed on the largest scale and in the most varied diversity. The Scottish Highlands are built up of the most ancient rocks of the British Islands, and possess a geological structure of extraordinary complexity. They include a vast variety of minerals, which, rising to the highest elevations in the country and exposed to the severest climate, have impressed their individual characters upon the landscapes. Thus, in the north west, where the simplest groupings of rocks is to be seen, masses of horizontal dark red sandstone have been carved into the huge pyramids that form so singular a feature in the scenery of Ross and Sutherland. In the central and south-western counties gleaming white cones show where the quartzites rise to the surface. In the Eastern Grampians high, craggy moors, encircled with stupendous corries and precipices, mark the site of the bosses of granite.



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THE OLD MAN OF HOY: A STACK OFF THE COAST OF THE ORKNEYS.

Among the Western Isles dark splintered crests and pinnacles point out the position of the gabbros. Perhaps the most rugged ground is to be seen among the mica schists, which combine a wonderful array of pointed peak and notched ridge with tumultuous masses of craggy declivity.

In the Eastern Grampians the mountains include large tracts of undulating moorland, which, though lying along the summits of the chain, are level enough to be capable of conversion into racecourses. These hills are separated from the sea by a tract of lowland, and lie thus entirely inland.

On the west side of the Highlands, however, the ground between the straths and glens mounts upward into narrow ridges, not infrequently sharpened into knife-edged crests, while the whole aspect of the landscape is rugged, rocky, and bare. Land and sea appear there to be inextricably intermingled. Islands, peninsulas, and promontories are penetrated or surrounded by sounds and sea-lochs in such a curious way that even in what might be thought to be the very heart of the country the tides of the Atlantic are found to ebb and flow into remote and solitary glens. The mountains plunge abruptly into the salt water, and for the most part only along the valley bottoms are little strips of level land to be seen.

As a consequence of this intricate interlacing of land and sea, the warm, damp breezes from the Atlantic furnish abundance of mist, cloud, and rain to the Western Highlands. Thus to the wilderness of rugged mountains and stormy firths there is added a marvellous range of atmospheric effect. Nowhere in Britain can such union be beheld of picturesque mountain form and of clear and vivid colour. Nowhere is the grandeur of a winter storm more impressive than when a south-westerly gale drives the breakers against the headlands, howls up the glens, and fills every gully with a foaming torrent.

Sir A. Geikie—"Types of Scenery and their Influence on Literature." Romanes Lecture, 1898.

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Occupation and Population of Western Highlands

Confining our attention primarily to the more rugged Highlands themselves, and especially the Western Highlands, we find the occupations of the people to be very simple and their number not great. On the uplands there are large tracts where the soil is too thin for farming, and over many miles the bare rock is exposed. Even though the soil were good in these uplands, the season is too short for farming and the climate too damp. The Scotch mist encourages a luxuriant growth of swamp-loving plants here, not only on the more level tracts, but even on moderately steep slopes. The sphagnum moss and associated heather, and other plants, thrive here to such an extent that it would be difficult to farm this land, even if the temperature permitted. While unfavourable to agriculture, the peat moss, which forms extensive bogs, furnishes a supply of fuel to the valley farmers. However, in most places the dampness is sufficient to cause the development of extensive bogs even in the valleys, supplying the greater part of the demand of the sparse population.

The heather-covered upland, though useless for farming, is not wholly valueless, for it serves as pasture-ground for immense numbers of sheep, and is the home of the deer, grouse, and rabbits, which are allowed to live here for the sport of the hunters.

It is sheep-raising, however, that is the fundamentally important industry of the Scottish Highlands. In all Scotland there are about 4½ million people, most of whom live in the Lowlands, but there are 25 million sheep, the larger number of which are in the Highlands; 4 million acres in Scotland are uncultivated, and there are 9 million acres of heather, while a little less than 5 million acres, a very large part of which is in the Lowlands, are given over to crops and grass; 21·9 per cent. of the surface is uncultivated, 40·4 per cent. is heather, etc., and 25·2 per cent. is cultivated.

Although the greater part of the Scottish Highlands is either in heather or else utterly worthless, there is some agriculture in the valleys. Indeed, farming is undertaken even in some of the narrow valleys with rugged morainic soil, while in many of the broader valleys there are fairly extensive farms. But in these Highland valleys there is not only soil limitation, but also limitation of agriculture due to unfavourable climatic conditions. The dampness makes it difficult to dry the hay and the grain and the shortness of the season and the prevailing cloudiness interfere with the maturing of these crops. In the Western Highlands frost occurs late in August.

The uneven rugged mountain masses of the Scottish Highlands have greatly interfered with communication across country, and have encouraged the development of clans. This, together with the economic poverty of the region, tended towards that isolation which so long maintained the independence of the Highlanders. One may still see the kilt worn in the more remote districts, and the Keltic language is not uncommonly heard. Even at the railway-stations of some of the new lines that have pushed their way into the more remote Highlands one may hear Keltic spoken.

The effect of glaciation has somewhat diminished the degree of isolation of the various parts of this region. Passes have been lowered by the ice scouring, so that they are more easy to cross, and by glacial action lakes have been formed which served as highways of early Highland travel, as they do at the present time. Where the trails of the Highlanders extend through the valleys that are modified by glacial erosion, roads have more recently been built, and in some places even railroads. Now an ever increasing tourist business, making use of the roads and lochs, has developed.

Among the highways into the Highlands none equals in importance that of the great valley occupied by the Caledonian Canal. This is a wonderful natural highway, depending in the first place upon a line of faulting across the Highlands, and in the second place upon the enlargement of the depression by stream, and later by glacial erosion. The passage of ice along this valley has steepened its sides, owered its bottom, and, on the recession of the glacier, has left a series of navigable and very beautiful lochs. At considerable expense the gaps between the lochs have been crossed by canals, but this ambitious enterprise was foredoomed to commercial failure by reason of the fact that the highway traverses an unproductive region, and furthermore by the fact that the Caledonian Canal really leads nowhere. To day it has degenerated largely into a mere tourist highway, far-famed for the grandeur of its unique and typically Scottish scenery.

Although the Lowlands of Scotland have come to be a very important manufacturing centre, the Highlands have practically no manufacturing. One reason, of course, is that there is no coal, and that it is difficult to bring this heavy fuel into the mountain valleys. A second reason is that there is practically nothing to manufacture excepting wool and grain. The former, scattered widely over the Highlands, is most easily gathered into small lots for shipment to the Lowlands and elsewhere. The latter is locally manufactured to some extent, and among the most notable of the manufactories of the Scottish Highlands are the whisky distilleries.

While coal is absent, there is an abundance of water power. The heavy rainfall of this damp climate supplies plenty of water, and in numerous places this falls out of the hanging tributary valleys, cascading down the ice-steepened slopes of the main valleys. But this water power, due largely to glacial action, is for the most part allowed to run to waste, for there is almost no local use for it.

RALPH S. TARR.—"The Scottish Highlands." *Bulletin of the American Geographical Society*, December, 1908.

By permission of the Author.

The Shetland Islands

The Shetland Islands are easily accessible from Leith or Aberdeen, and the sea voyage can be done in sixteen hours. Undoubtedly the finest way of getting to the Shetland Islands is to go by boat from Liverpool. The boat calls at several places on the west coast of Scotland, and the lochs are seen to great advantage. It is necessary to change at Stromness, Orkney, where a few days may be very pleasantly spent among the magnificent rock scenery on the coast going northwards, and the very interesting and probably unique archæological remains.

The Shetlands are a group of about 100 islands, nearly 30 of which are inhabited. Though in the same latitude as Cape Farewell in Greenland, they are not at all cold, as they lie on the northern branch of the Gulf Stream. The most southerly point of the islands is about 110 miles from the Scotch coast, and the most northerly is nearly double that distance.

We are here getting into the land of the midnight sun. At midnight in the summer golf is played, photographs can be taken, and even a newspaper can be read without difficulty. In the winter the day is more than two hours shorter than ours, but the nights are brightened by the aurora borealis, or merry dancers, as they are locally called, which fill the heavens with their beautiful soft light, and emit a faint crisping sound.

. . . There are no hills of any magnitude in Shetland; in fact, there is only one which is more than 1000 feet high; there is consequently no shelter, and the gales, which make the magnificent rock scenery of the west, sweep over the islands and render the interior barren and desolate. Only about one-thirtieth of the area is cultivated. There are no trees, and all attempts to cultivate them have ended in failure.

The only grain that can grow is bere, but this is so beaten down by the storms that reaping with a scythe is impossible, and it has to be cut down in handfuls with a sickle. This very tedious work is done by the women, who, however, do it so carefully that not a single reed is left. Hay has usually to be cut in the same way. Turnips will grow, but usually they have to be planted in very small patches, and have a stone wall set round them so as to protect them from the wind.

The soil is not fertile, and the climate is utterly against any possibility of cultivation. As already stated, it is very warm, owing to the Gulf Stream, and for the same reason it is equable, the mean temperature being 44·6° Fahr., and the variations in winter and summer being only comparatively small.

The annual rainfall is 37·15 inches, and this seems to come down in a perpetual drizzle. The rainfall of Manchester is about 30 inches. It is not difficult, then, to understand that crops are very uncertain, and that systematic farming on a large scale is quite out of the question, excepting in a few isolated valleys.

Wood and coal have alike to be imported, and, of course, they cannot be used by the crofters on account of the expense. Peat is therefore burned. This is cut out of the bog by the men in May with a peculiarly shaped spade, and it is done so quickly that in three days one man can cut sufficient peat to last a whole year. The separate pieces are then stacked by the women in such a way that hey may dry; and during September the peat is carried o the house, also by the women, in baskets called "cazies," lung over their backs by a band across the chest. This is ruelly hard work, ten or twelve cart-loads being required or each family—for peat burns quickly—and sometimes it as to be carried a distance of more than a mile. Formerly people could cut peat anywhere on the hills, but this hreatened to use up the peat too quickly, and now each rofter has a certain area of the hill allotted to him, from which alone he may take peat. The "cazies" are made by he women from rushes. They also make their own shoes, called "rivlins." These rivlins consist simply of a piece of cowskin, with the hair left on, sewn into the shape of a slipper.

The younger men who can often leave the islands, and many of them have risen to good positions. Owing to this emigration the population fell from 29,715 in 1881 to 28,711 in 1891.

From an article by E. J. Russell, B.Sc., in the *Journal of the Manchester Geographical Society*, July, 1897.

The Weavers of the Western Isles

It is a far cry from the busy woollen mill, with its rattle of looms and din and whir of machinery, to the isolated cottages of the Hebrides where the island weavers make by hand, slowly and laboriously, the tweeds for which Harris has become so famous.

To locate the island of Harris one has only to look at the map of Scotland, with its west coast-line "all tattered and torn," like the garb of the man in the nursery rhyme. Pick out of the hundreds of islands there the outermost-lying group. Harris and Lewis form practically one island of the Outer Hebrides.

It is hard to explain the impression Harris makes on the visitor. It is well that the "amphibious nature of the country," as the Irishman put it, prevents one from going directly to this island in too short a time. Nature has her own way of keeping us from the goal until we have learned the lessons by the way, and one cannot see and read Harris without the light of just such a trip as we must take perforce. Not only must we learn to love the treeless hills, discovering other beauties which compensate, learn to accustom our ears to the constantly spoken Gaelic, but we have yet to learn the ABC of those lives, silent, forceful, spent on those islands in constant endeavour to wrest from Nature a bare existence. This you begin to learn as you sail in and out, touching at this point and that.

By the chain of Royal Mail steamers we are carried from Glasgow to our final destination. From Glasgow to Oban, the Queen of the Highlands; Oban to Fort William, at the foot of Ben Nevis; Fort William to Mallaig (the most beautiful short stretch of railway in the British Isles, and the only bit of land travel on the trip); Mallaig to Kyle of Lochalsh, well worth more than a brief visit, with its views of loch and sea; Kyle over to Portree (Isle of Skye); and Portree across to Harris. Such is the route.

By the time Harris is reached one has learnt many things, both of Nature and human nature. We look at the shores approaching with open eyes, ready to see into the heart of things. A grey sky, a grey-blue sea, grey rocks, with no sign of habitation. It is a surprise to see one of the masses of grey rock slowly resolve itself into a house or hut. Fishing, a patch of oats, and a few sheep—this constitutes the cottagers' means of livelihood.

Landing at Tarbert, the town of the island, we come back along the hills seen from the steamer. Treeless hills, green where the soil is thick enough for sod to grow, stretch on before us, the grey rock, a gneiss, cropping out at every turn. One comes across here and there stacks of peat neatly arranged. First cut, dug, then dried in small quantities, and finally stacked. Having preconceived notions of the locality possible for peat-bogs, it is a surprise, to say the least, to find them here crowning the rounding summits of hills. Levels or hollows seem in no way necessary for a bog.

Once over the brow of the hill, one of the crofter's holdings comes in sight. A little cottage built of stone, with a thatched roof of straw, the simplest, least progressive form of crofter's hut, has for its only opening the doorway. Here and there a crevice may be left between the stones to allow some of the soot to pass out. A hole is also left in the roof, into which a barrel is neatly fitted. This hole with its barrel constitutes the chimney. Entering the house, it seems perfectly dark but for the glowing mass of peat in the middle of the floor. Looking up, you see that it is located directly under the barrel opening, whilst suspended from the roof is a heavy iron chain, with an immense hook for the kettle or other cooking utensil. That fascinating odour of burning peat which greets you secretes itself in every thread of the tweed that the woman is weaving. . . .

A sudden turn from the road, and we strike across the moor. On a rock I noticed what seemed to be the remains of a wig, a radiant Titian red in hue. Picking it up, it turned out to be a bit of soft silky wool, not short and tightly curled, but in strands and weaved. But whence the glorious colour, the rich red brown? I soon found I had stumbled upon the first steps in the series of the tweed. Near by stood a kettle and the remains of a fire. Here the crofter's wife had been making the dye with which to colour the wool. Painstakingly, slowly she had collected from the grey rocks the foliaceous lichen, *Parmelia saxatilis*, Gaelic "crotal," which clings so closely. By boiling it here in her open-air laboratory she has made the rich red-brown dye, then dipped the wool into it, and spread it out on the rock or low bushes to dry. Should she have wished another colour, she has learned to use the root of the iris growing there in that pool near us. The heather which crowns the moor with its hardy bloom she may make pay its tribute, a beautiful green, to the cloth to be. Nearly every dye used by the Harris weavers is a natural dye. Most wonderful of all is the origin of a brilliant yellow, with a tint of brown. Soot! the black soot from the burned peat gives this brilliant colouring. That the islanders should have discovered for themselves such an extensive list of dyes, utilizing the scanty gifts of Nature to effect so many shades, gives us some idea of their indomitable will and energy. At least twenty of these are vegetable dyes, obtained, of course, from the flora of the island. In addition to these, there are the "natural sheep greys" and "browns," where the wool is not dyed, but used as it is in its natural colour.

Reaching the cottage whose dye-pot and drying wool we have been inspecting, we may see the next process the wool undergoes. Quietly and easily the crofter's wife manipulates two very awkward paddles beset with teeth, like a curry-comb. With these she cards the wool, pulling it apart, teasing out the separate strands, and finally with a deft little movement lays the strip of wool on the back of the paddle, gives it a little rub with the back of the other one, and the operation is completed.

Over in the corner stands the small spinning-wheel. Harris tweed is single width, and to those who have seen where it is made it is a surprise that it has any width at all, so tiny are the rooms in which the crofters live and work.

The cloth woven, it is taken from the loom and "wanked." After being soaked in hot water and a strong solution of soda to take out the oil, it is placed on the "wanking-board," a long piece of wood with grooves in it, like a scrubbing-board. A number of women sit at each end and "wank" the cloth back and forth. Soap is rubbed on. In this way the cloth is cleansed, shrunk, and the fibres closely interwoven.

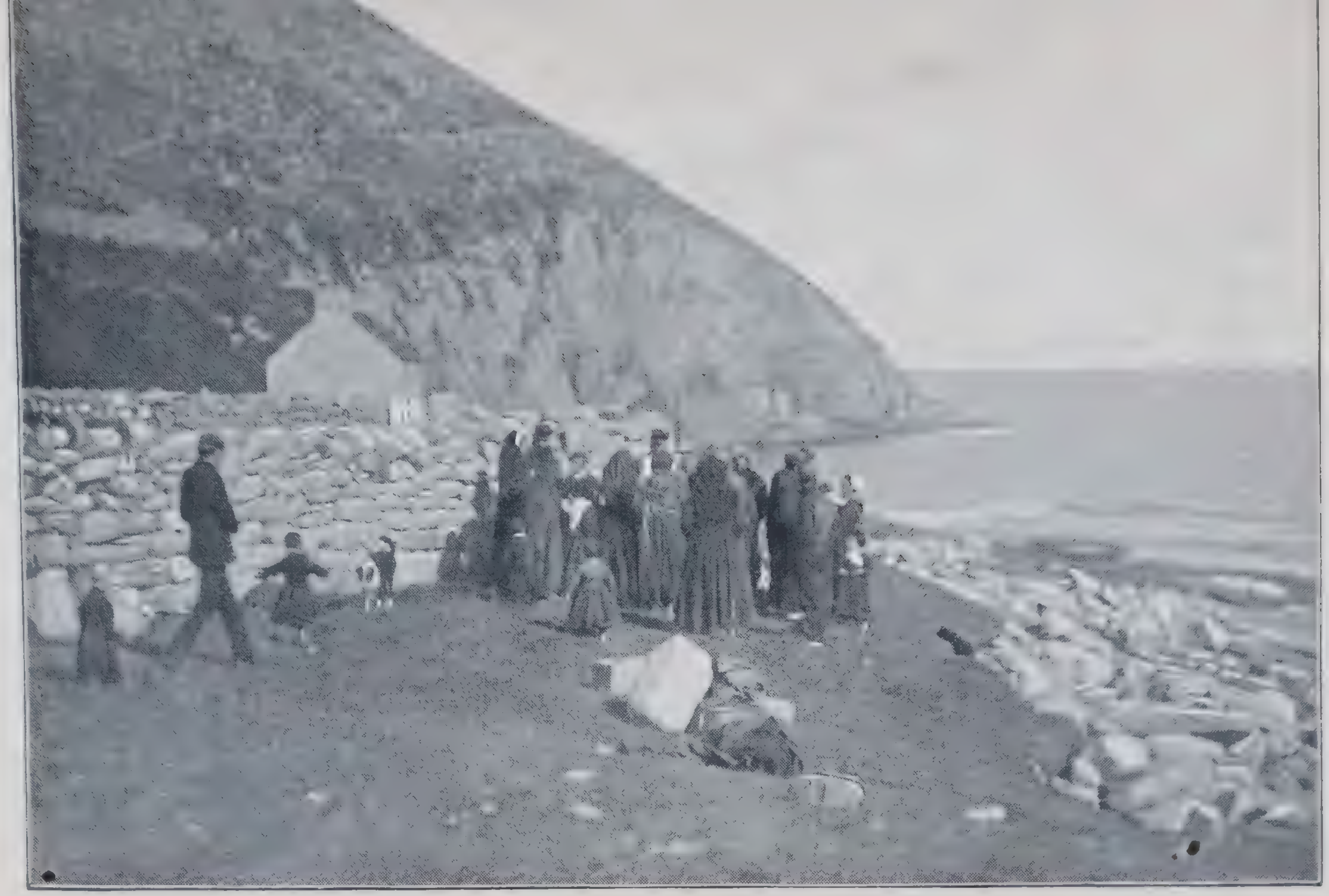
The "wanking" over, the piece of tweed has still rough times in store for it before it is finished. Down by the barn or loch the women may be seen washing and beating the cloth with a stick to get all the soap out. It seems ncredible, when handling the soft, beautiful cloth when dry, that it has ever survived such a stormy history. Thoroughly washed and chastised, it is rinsed until the water runs clear. Dried in the open air, exposed to sun and rain, it is finally rolled into balls and carried on the back of some lass to town.

From an article by AGNES V. LUTHER in the *Journal of Geography*, April, 1902.

St. Kilda : an Outpost of the British Isles

As the Outer Hebrides faded away behind us, a small conical object was just visible ahead, far away westward, and looking like a lonely sentinel standing at the edge of the world. This was the first glimpse of our goal—St. Kilda—that storm-tossed island where the most treasured possession is a rope, and where the people exchange their New Year's greetings with the outside world at midsummer. Then darkness and silence reigned supreme, and we had to wait for daylight and the assistance of the islanders before we could effect a landing, which is far from being a simple matter even under the most favourable conditions.

Our first view of St. Kilda from the deck of the *Hebrides*, as she lay at anchor in the village bay, was weird and desolate in the extreme. An amphitheatre of stony slopes bathed in sea-fret, and a single row of one-story cottages, constituted the whole scene. One had yet to learn that the skyline formed the edge of a precipice going sheer down to the sea on the other side, and, having entered the bay during the night, we had seen nothing of the majestic cliffs which surround the rest of the island, rising in some places almost vertically from the tempestuous sea to a height of 1000 feet and more. Truly an ideal haunt for the sea-fowl which dwell there in countless thousands, and were doubtless in possession of it for untold ages before the advent of man. To-day the human population consists of some seventy souls, to most of whom St. Kilda and the small islets associated with it constitute the known world. The St. Kildan loves his rocky home amid the wild Atlantic waves too well to wander more than a few miles away from it, and so his knowledge of the outer world is only second hand, obtained either from the minister or from occasional visitors from "the adjacent island of Great Britain." It seems almost incredible that a place within the confines of the British Isles can be so isolated that most of the people living there have never seen such commonplace objects as



AN OPEN-AIR SERVICE ON ST. KILDA.

a tree or a horse, but such is the case. For nine months in the year the St. Kildans are quite isolated from the rest of the world, and are absolutely without news concerning the remainder of the human race, unless some stray fishing-boat happens to wander so far under unusually favourable conditions.

By one of these unexpected visits news of the death of Queen Victoria reached St. Kilda only some two months after date, but in the ordinary course of events they would not have heard of it before the middle of June. Some three or four trips are usually made by Glasgow steamers during the three summer months, but for the remainder of the year the island is almost inaccessible, owing to the tempestuous character of the surrounding elements.

The most valuable gift which Nature has bestowed upon this strange little colony is the countless myriads of sea-birds which have established breeding-places on St. Kilda and the adjacent islands. The types most plentiful are the fulmar-petrel, the gannet or solan goose, the puffin, and the guillemot, all of which are valuable in being the staple of the food-supply, or else for their feathers, which are a marketable commodity. Fowling is thus the chief occupation of the St. Kildans, and they have in the course of many generations devised some curious means of capturing their prey. The men are all expert cragsmen, and are proud of the fact that their calling is attended by so much danger, and requires so much courage. The bird which is always peculiarly identified with St. Kilda is the fulmar-petrel, which in size and appearance resembles a gull when seen on the wing, but is in reality quite different both structurally and in its mode of flight, having the beak of an albatross, of whose family it is a member.

The St. Kildans live on Socialistic principles in regard to their chief industry, fowling. Every year the rocks where the fulmars breed are divided into lots. These are allocated to the different members of the community. The outlying islands of Boreray and Soay and the rock-stacks are, however, common property. When the able-bodied fowlers return from a day's sport, the "catch" is divided, so that all get a share. In this way those who are too old to work and the widows and orphans are provided for.

Nothing is known as to when and how this desert island first became peopled. The present inhabitants nearly all bear Scotch names. Their language is Gaelic, and until a few years ago English was an unknown tongue to the whole population, with the exception of the minister. At the present time, however, the children are taught English.

With regard to the St. Kildan as a weaver we need only say that the looms are hard at work for about two months in the year, when the nights are long and dreary; and we are told that during that time the shuttle is heard in almost every cottage, and the work carried on with astonishing zeal. The young women do their share of work in the capture of sea-fowl and plucking the sheep, and for this purpose are taken across to the inhospitable island of Boreray every summer.

During their stay they live in an ancient semi-subterranean dwelling, which is still lighted by the stone lamp of a prehistoric age. Several of these underground houses have been discovered in St. Kilda. A curious feature of St. Kilda is the large number of small dome-shaped buildings (called "cleits") scattered all over the island. They look like Kaffir huts when viewed from the village bay. They are ingeniously constructed of rough stones to serve as drying-places, in which the grass is placed as soon as it is cut, for the climate is not suited to hay-making in the orthodox open-air fashion. The roof is thatched, and the stones of the side-walls are so placed that access of rain is prevented, while a good current of air is allowed to pass through.

From an article, "An Outpost of the British Isles," by ALFRED DENNY, of University College, Sheffield, in *Travel*, July, 1902.

Inverness-shire

On the 9th September, 1861, what is now called the Highland Line was opened. The idea of such a line was at first ridiculed on account of the engineering difficulties, but these were successfully overcome. There are few travellers who are not familiar with this route to the Northern Highlands. It passes through the most beautiful mountain scenery in Scotland, and the passenger who leaves London at night is landed early in the forenoon of next day at Inverness.

Another line of railway also reaches our county from the south. Starting from the Firth of Clyde, by the shores of Loch Lomond, through the solitudes of the Black Forest, across the Moor of Rannock, and by the valley of wild Loch Treig, the West Highland Railway finally debouches into the valley of the Spean, by which it arrives at Fort William.

One result of the opening up of Inverness-shire to the rest of the world has been, as might be expected, the increase and prosperity of its various towns. The burgh, founded by King David I., and to which William the Lion granted privileges, is now one of the most beautiful and flourishing towns in Scotland for its size. It has lost the primitive character which distinguished it through many centuries, when it had to struggle for very existence in the midst of wild and hostile tribes. Its ancient castle and fort have disappeared. There are few views in Scotland or anywhere else exceeding in beauty that which is commanded from the upper heights of the town, when the spectator looks down on the wooded islands of the river, the blue waters of the Moray Firth, and sees bounding his view the Ross-shire hills and those of the Beauly valley.

The business and trade of Inverness has been on the increase since the opening of the Caledonian Canal, and it is more worthy to-day than at any previous time of the ame so frequently given to it—the Capital of the Highands.

The beauty of Inverness-shire is an inheritance of which t is not likely to be ever deprived. Other districts of Scotland may be richer in mineral and industrial wealth, ut none can surpass Inverness-shire in the grandeur and oveliness of its scenery. It is especially the "land of the mountain and the flood." Its mountains present every ariety of form. Within its bounds are the highest and grandest of Scotch hills. The Grampians form its southern oundary, rising in Ben Nevis, the highest peak in Great Britain, to a height of 4406 feet. From the borders of Arisaig to those of the Moray Firth one mountain rises behind another like the billowy waves of a tempestuous sea, sometimes clothed with heath, sometimes with forests of pine and fir, sometimes bare and verdureless, but always grand and impressive.

Water everywhere blends with rock to soften the asperity of the landscape. The rivers of the county—the Spey, the Nairn, the Findhorn, the Beauly, the Spean—and the great lakes of Lochy and Ness, Erich, and many others, vary the wildness of the scenery. Nor must we forget the great arms of the sea by which the west coast of the county is indented, reaching up far among the mountains. They rival in their beauty and picturesqueness the Norwegian fiords.

The climate of Inverness-shire is in one respect similar to that of the rest of Scotland. The rainfall on its western side is very great. It is generally said that the annual number of rainy days at the Inverness end of the Great Glen is about sixty days less than at Fort William, its western extremity. But though the rainfall is great, the temperature is mild. Winter is genial, and there is little frost or snow, especially on the west coast.

J. Cameron Lees, LL.D.—"Inverness," *County Histories of Scotland.*

By permission of William Blackwood and Sons, Edinburgh, 1897.

Moray and Nairn

Relatively small though these counties are, they have from the first, but especially of late years, occupied a front place in the agriculture of Scotland. This position they owe to their exceptional advantages in the way of climate, soil, and geographical position.

The general aspect of the two counties is, first, a seaboard plain, diminishing in depth from east to west, from the mouth of the Spey to the mouth of the Nairn; then a range of low hills, whose highest peak is only 1797 feet high, dividing the lowlands from the wilder region behind; and, lastly, a tract of more or less Highland country, full of glens and straths running from south to north, through which the four rivers of Moray and Nairn—the Spey, the Lossie, the Findhorn, and the Nairn—find their way into the Moray Firth.

From an agricultural point of view, this seaboard plain is worth all the rest of the two counties put together. That portion of it which lies within the county of Moray is known by the local name of the "Laigh of Moray." It is a tract of rich alluvial country formed of the detritus of the four rivers above mentioned. Here are to be found the kindliest soils, the most genial climate, the most prosperous farms, and the heaviest crops within the district. The agriculture of this region has a competitor only in the fertile fields of East Lothian.

The Laigh of Moray is about 30 miles in length, and from 5 to 12 miles in breadth. Slightly undulating towards the east, it is almost a dead level between Alves and Kinloss, its most fertile portion. It is not by any means a picturesque piece of scenery. Yet it is not without an attractiveness of its own. The well-to-do farms, the rich fields, the general air of ease and wellbeing that prevails, constitute a landscape which, though neither grand nor impressive, is undoubtedly pleasing.

On the southern side of the range of hills already eferred to—a range which has no distinctive appellation, ut is known by the names of the various districts it passes hrough—lies the great strath or valley of the Spey. Off his diverge various smaller straths, full of natural beauty, nd some of them almost as fertile as the Laigh. There are o deer forests in the county, though roe-deer are to be ound in many of the woods.

The climate of both counties has always been one of heir strong points. It is an old saying that Moray has orty days more summer than any other part in Scotland. f sunshine is the test of summer this is possibly true. But alike in Moray and Nairn, the climate is exceedingly ariable, the pendulum swinging from extreme cold in vinter to extreme, and even distressing, heat in summer.

The climate in the hill regions is both colder and more ariable than in the lowlands. The rainfall is also greater. The moisture-charged clouds from the north and west weep over the plain, but are arrested and broken by the ills in the southern and south-western districts of the two ounties. The greatest misfortune that can befall this egion is drought, and, unfortunately, it is of too common occurrence. This, however, is counteracted in great measure y the depth, the richness, and the recuperative power of a arge proportion of the soil.

Charles Rampini, LL.D.—"Moray and Nairn," *County Histories of Scotland.*

By permission of William Blackwood and Sons, Edinburgh.

Alluvial and Recent Deposits

Owing to the great diversity of rocks which exist within he area under notice [*i.e.*, the Grampians and Strathmore], here is an almost equally great difference in the character of the soils. Soils are derived from rocks, and many of heir most important properties can be traced to the solid rocks which underlie them. In the Highland region the chistose and granitic mountains are usually covered with heath, and are barren; this, of course, is due to their altitude, as well as to the fact that their rocky materials often lie bare to the surface over wide areas. Strips of fertile meadow-land can often be found along the borders of streams or rivers, but they are usually not of any great extent. For this reason the Highlands may be looked upon as forming a wide pastoral country, the abode of grouse, black cattle, sheep, and red-deer.

The valley of Strathmore is covered with a thick deposit of boulder-clay, the materials of which have been derived, to a great extent, from the schists of the Highlands.

In a similar manner the Ochils and Sidlaws have been covered by a deposit of boulder-clay, which has been largely derived from the Old Red Sandstone rocks of the valley of Strathmore. It will be seen, then, that the vegetable soils are not directly derived from the underlying solid rocks, and that soils of different characters may overlie the same geological formation. The boulder-clay, then, is an important factor in determining the nature of the soil, and ought always to be taken into account when the source from which the soils have been derived is under consideration. Leaving this aspect of the question out of consideration in the meantime, we may note that, in the Highland portion of the region under notice, the soils have been largely derived from the crystalline schists, and are to a large extent arenaceous, or sandy, rather than argillaceous, or clayey. They are usually of no great depth, and in a dry season suffer from a lack of sufficient underground moisture. The most valuable soil in the Highland area is the haugh soil of fine alluvium which occurs in the river valleys, such as can be seen around Killin, in various parts of Glen Dochart, Strath Fillan, and in other glens in various parts of the district.

In the great valley of Strathmore the arenaceous element also predominates to a great extent in the composition of the soils. There is, however, a greater proportion of peroxide of iron in the soil, and it is usually richer and

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STIRLING: VIEW OF THE CASTLE AND SURROUNDING COUNTRY.

deeper than in the Highland area. The alluvial deposits of the rivers have also stretched over wider areas than in the Highlands. A thick bed of stiff clay forms a flat tract, extending for over 18 miles along the Forth, from Bridge of Allan to Gartmore Bridge. A similar bed of clay covers by far the larger part of the Carse of Gowrie. The slopes of the volcanic hills, such as the Sidlaws and Ochils, are covered by soils rich in soda, potash, and magnesia, which have been derived from the disintegration of the volcanic rocks.

Extensive deposits of peat are to be met with both in the Highlands and Strathmore. They have been formed by the annual growth and decay of vegetable material. The mosses are the most important peat-forming plants, and mostly belong to the genus *Spagnum*. The stems of the bog-moss wither and die, while the upper portion of the plant continues to flourish; and in this way it may gradually form a bed of great thickness The roots and stems of other plants also contribute to the accumulating bed, forming a tangled mass, which holds water like a sponge, and this constitutes a favourable soil for the growth of the moss above. During floods muddy water may be washed into the moss. Dust may also be blown over the marsh by winds; this helps to consolidate the felted mass, and a deposit of considerable firmness is produced.

In the deeper and older parts of a peat-bog the mass is more or less compacted, owing to the superincumbent pressure; it then takes the form of a brownish-black, felt-like, or almost compact mass. On the slopes of mountains and on moorlands the peat rarely reaches more than a foot in thickness, and is generally of an incoherent texture. The plants which form it are usually the heaths and rushes which grow in such situations.

Forest peat is characterized by its flaky texture, and this texture may often be recognized, though there may be no roots or fragments of trees present. When trees are present they are usually oak, Scotch fir, birch, hazel, and lder; along with these there may occur fragments of the lants which grew under their shade, or which have arisen pon the swampy ground which has followed the destruction f the wood or forest. In many instances great thicknesses f peat have been accumulated in boggy marshes or upon he sites of silted-up lakes. This type of peat is noted both r its depth and extent, and it includes some of the largest racts which have been brought under cultivation.

Peter Macnair.—*The Geology and Scenery of the Grampians.* Maclehose.

By permission of Messrs. Maclehose.

Volcanic Scenery: the Isle of Skye

In the singularly varied landscapes of the Inner lebrides three distinct types of topography attract the eye f the traveller. These are best confined and most fully eveloped in the island of Skye. Throughout the northern alf of that picturesque island the ground rises into a rolling ableland, deeply penetrated by arms of the sea, into which slopes in green declivities, while along its outer borders plunges in ranges of precipice into the Atlantic. Every-here, alike on the cliffs and the island slope, long parallel nes of rock-terrace meet the eye. These mount one above nother from the shores up to the flat tops of the highest ills, presenting level or gently-inclined bars of dark crag at rise above slopes of débris, greensward, and bracken. is these parallel, sharply-defined bars of rock, with their tervening strips of verdure, that give its distinctive naracter to the scenery of Northern Skye. On hillside ter hillside, and in valley after valley, they reappear with e same almost artificial monotony; and far beyond the mits of Skye they are repeated in one island after another, l down the chain of the Inner Hebrides.

In striking contrast to this scenery, and abruptly bound-g it on the south, rise the Red Hills of Skye—a singular oup of connected cones. Alike in form and in colour, these hills stand apart from everything around them. The verdure of the northern terraced tableland here entirely disappears. The slopes are sheets of angular débris—huge blocks of naked stone and trails of sand, amidst which hardly any vegetation finds a footing. The decay of the rock gives it a pale, yellowish-grey hue, which after rain deepens into russet, so that in favourable lights these strange cones gleam with a warm glow, as if they in some special way could catch and reflect the radiance of the sky.

Immediately to the west of these pale, smooth-sloped cones the dark mass of the Cuillin Hills completes the interruption of the northern tableland. In almost every topographical feature these hills present a contrast to the other two kinds of scenery. Their forms are more rugged than those of any other hill-group in Britain. Every declivity among them is an irregular pile of crags, every crest is notched like a saw, every peak is sharpened into a pinnacle. Instead of being buried under vast sheets of their own débris, these hills show everywhere their naked rock, which seems to brave the elements as few other rocks can do. Unlike the pale Red Hills, they are dark, almost black, in tone, though when canopied with cloud they assume a hue of deepest violet.

In no part of North-Western Europe has volcanic activity left more varied and abundant records than in these three contiguous tracts of Skye. It is interesting, therefore, to note the striking contrast between the former and the present landscapes of the region. The lavas of the basaltic tableland crumble into a rich loam; that in the mild, moist climate of the Hebrides supports a greener verdure than any of the other rocks will yield. The uplands have accordingly become pasture-grounds for herds of sheep and cattle. The strips of lowland along the valleys and in the recesses of the coast-line furnish the chief tracts of arable land in the island, and are thus the main centres of the crofter population. The bays and creeks of the much-indented shores form natural harbours, which in former days attracted the Norse sea-rovers, and supplied them with sites for their settlements.

The mountain groups which so abruptly bound the basal plateau on the south, and present in their topographical features such distinctive scenery, comprise a region too lofty, too rugged, and too barren for human occupation. The black Cuillins and the pale Red Hills are solitudes left to the few wild creatures that have not yet been exterminated. The corries are the home of the red-deer. The gabbro cliffs are haunts of the eagle and the raven. Where patches of soil have gathered in the crannies of the gabbro Alpine plants find their home. In the chasms left by the decay of the dykes between the vertical walls of their fissures the winter snows linger into summer, and conceal with their thick drifts the mouldering surface of the once molten rock beneath them. On every side and at every turn a mute appeal is made to the imagination by the strange contrasts between the quiet restfulness of to-day, when the sculpture tools of Nature are each busily carving the features of the landscape, and the tumult of the time when the rocks, now so silent, were erupted.

—Sir A. Geikie.—*Ancient Volcanoes of Great Britain*, vol. i: Macmillan and Co.

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The Skerryvore Lighthouse

The cluster of rocks of which that called Skerryvore is the largest has ever been a just cause of terror to the mariner. The importance of the Skerryvore as a station for a lighthouse is so evident as to require but little comment. Although the smaller class of coasting vessels almost invariably sail through the sheltered sounds of Mull, Loing, and Islay, to avoid the difficulties and dangers (Skerryvore among the number) of the rough navigation of the outward passage, yet these rocks lie much in the track of the larger vessels bound overseas round the north of

Ireland from the Clyde and the Mersey. Government cruisers and ships-of-war are also necessarily often within a short distance of its dangers. But for homeward-bound vessels sailing for the Clyde, or for any of the ports in the Irish Sea, and directing their course for the North Irish Channel, the establishment of a light at this place is of the last importance.

The Skerryvore Reef is a tract of foul ground, consisting of various small rocks—some always above the level of the sea; others covered at high-water, and exposed only at low water; and others, again, constantly under the surface, but on which the sea is often seen to break after heavy gales from the westward. This cluster of rocks extends from Tyree in a south-westerly direction, leaving, however, between that island and the rock called Boinshly, the first of the great Skerryvore cluster, a passage of about 5 miles in breadth, and having a depth of 13 fathoms at low-water of spring tides, but not without hidden dangers which line the rugged shores of Tyree. This passage is called the Passage of Tyree, but it is by no means safe during strong and long-continued gales, as the sea which rises between Tyree and Skerryvore is such that no vessel can *live* in it.

The name Skerryvore is derived from the Gaelic and signifies the Great Rock. It is very much wasted and cut up, the number of detached rocks sunk and exposed in its immediate neighbourhood whose positions were determined during the survey amounting to no fewer than 130. The surface of the main or principal rock, on which the light-house has been placed, measures, at the lowest tides about 280 feet square. It is extremely irregular, and is intersected by many gullies or fissures of considerable breadth and of unlooked-for depth. The extremity of one of these gullies forms the landing-creek, and with the help of some artificial clearing and dressing, which was executed with much difficulty by blasting under water while the other works were in progress, its sides and bottom are now comparatively smooth.

Another of the gullies was found on examination to
ndermine the rock to the extent of 8 or 10 feet, and
terminate in a hollow submarine chamber, which threw
a spout or jet of water about 20 feet high, resem-
ling in appearance the Geyser of Iceland, and accom-
anied by a loud noise, like the snorting of some sea
onster. The effect of this marine *jet d'eau* was at times
xtremely beautiful, the water being so much broken as to
orm a snow white and opaque pillar, surrounded by a fine
apour, in which during sunshine beautiful rainbows were
served.

One calm day I contrived, at a very low tide, by means
ropes and a ladder, to explore the interior of the
avern from which this fountain rose, and found it to
rminate in a polished spherical chamber about 7 feet in
ameter, its floor filled with boulders, whose incessant
ay had hollowed it out of the veined rock, and rendered
s interior beautifully smooth and glassy. As I considered
at this curious cavern penetrated too far and came too
ose to what I had selected as the best foundation, I
anged the site of the tower, so as to avoid any chance of
s being undermined. I also deemed it prudent to fill up
e cavity, to prevent its further extension, and at the same
me to rid ourselves of the discomfort of being drenched
the column of water which spouted from it even during
ne weather when the sea was apparently calm. This
ally affords a good example of the power of pebbles kept
nstantly in play by the waves to wear down the hardest
ck, and shows what extensive effects so insignificant an
gent may effect in the course of time.

In addition to its shattered and disjointed appearance,
e Skerryvore Rock presents in another respect a striking
ample of the action of the sea. I allude to the glassy
noothness of its surface, a feature that existed to so re-
arkable an extent as to have proved throughout the whole
ration of the work a serious obstacle and hindrance to
e operations. There was considerable danger in springing

ashore from a boat in a heavy surf upon an irregular mass of rock as smooth and slippery as ice. The workmen were in that respect often sorely tried, and many inconvenient accidents occurred from falls. It was after one of these trials of patience that the foreman of the masons was heard very graphically to describe a landing on the rock as "like climbing up the side of a bottle." Instead of a weather-beaten rock, whitened by the dung of sea-fowls, and with marine crustacea adhering to it, the surface of the Skerryvore is smoothly polished by the action of the waves; every projecting angle or point is worn down, and the whole presents more the appearance of a mass of dark-coloured glass than a reef of gneiss-rock. Excepting in some of the more sheltered crevices, no marine crustacea find shelter; but different kinds of sea-plants grow upon it in great abundance at and below the low-water mark. These plants are doubtless enabled to resist the action of the waves in the same way as the sapling yielding to the blast is preserved during the storm that uproots the aged and more stubborn oak.

Among the many wonders of the "great deep" which we witnessed at the Skerryvore, not the least is the agility and power displayed by the unshapely seal. I have often seen half a dozen of these animals round the Rock, playing on the surface or riding on the crests of curling waves, come so close as to permit us to see their eyes and head, and lead us to expect that they would be thrown high and dry at the foot of the Tower, when suddenly they performed a somersault within a few feet of the Rock, and, diving into the flaky and wreathing foam, disappeared, and as suddenly reappeared 100 yards off, uttering a strange, low cry, as we supposed, of satisfaction at having caught a fish. At such times the surf often drove among the crevices of the Rock a bleeding cod, from whose back a seal had taken a single moderate bite, leaving the rest to some less fastidious fisher.

* * * * *

The light of Skerryvore was exhibited to the mariner on the night of the 1st February, 1844. The light is revolving, appearing in its brightest state once in every minute of time. It is elevated 150 feet above the sea, and is well seen as far as the curvature of the earth permits.

Alan Stevenson.—*Account of the Skerryvore Lighthouse.* A. and C. Black, 1848.

By permission of Messrs. A. and C. Black.

(*c*) THE LOWLANDS

The Lowlands of Scotland

Within 30 per cent. of the Scottish territory are included 65 per cent. of the population. This is the result of a remarkable combination of favourable natural conditions.

The country is a plain, with a rich subsoil and a fertile soil. Fractured from the Caledonian Chain, the Lowlands formed a strait in which the seas of Devonian and Carboniferous times deposited, together with an enormous accumulation of coal, horizontal beds of grit and friable schist, and, as well as being destined by their origin to form a flat country, have been still further planed down by prolonged erosion. The only points which exceed 100 metres (approximately 328 feet) are some isolated ranges of hills sloping N.E., such as the Stirling Hills, the Ochils and Sidlaws, which have been protected from erosion by the hardness of their eruptive rocks, and have remained elevated, as witnesses of its former state, in the midst of the total flattening of the country. The soft rocks in decomposing have yielded good arable land, still fertilized by glacial streams. Within the shelter of mountains, which protect them at the same time from the cold and from the rainy winds, the great plains of Strathclyde and Strathmore are covered by fields of cereals and vegetables; for a century wheat cultivation has been widely spread there.

It is in these fertile and populous plains that historical Scotland has grown up, first round Perth, and later round Edinburgh. Here numerous towns are clustered: Stirling, the guardian of the road from the Highlands; St. Andrews, the old national University, founded in 1411; Forfar, Clackmannan, Linlithgow, and so on. These historic towns still bear the marks of their picturesque past in their antique monuments and in their feudal fortresses planted on the summits of abrupt hills. Since the foundation of the University, in 1582, Edinburgh has remained the intellectual centre of Scotland—the Athens of the North.

Industry and commerce have given birth to a new Scotland. A great maritime region has been developed on the east; a great industrial region, originating on the western seaboard, has overflowed to the eastern side.

Commerce has brought in its train industries which have been rapidly developed by means of the coal. The flax and hemp of England, the cotton of the United States, the jute of India, are manufactured at Dysart, Montrose, Arbroath, Kirkcaldy, at the old reviving towns of Forfar, Perth, and, above all, at Dundee, which has made a speciality of commerce with India and of jute-weaving. But it is, above all, along the Forth in the vicinity of Edinburgh, and at the outlet of the great commercial route from Glasgow, that densely-populated communities congregate. Leith, Prestonpans, Musselburgh, Granton, and Portobello, now all continuous, form a centre of more than 100,000 inhabitants, a great commercial city divided into several administrative towns.

M. PAUL PRIVAT-DESCHANEL.—*Scottish Geographical Magazine*, November, 1902.

By permission of the Royal Scottish Geographical Society.

Edinburgh

It is not generally recognized that Edinburgh is further est than Liverpool, and much further west than London, eir respective longitudes being :

London... ..	0° 5′	west of	Greenwich.
Liverpool ...	2° 52′	,,	,,
Edinburgh ...	3° 12′	,,	,,

his is caused by Scotland making a bend to the west at e English frontier. With regard to the latitude of dinburgh (55° 57′ N.), the fact that its latitude correonds to that of Moscow proves that a city like ours, on seacoast influenced by the Gulf Stream, enjoys a mild inter climate, whilst an inland Continental city endures a gorous one. Thus, whilst the mean temperature of Edinurgh in January is about 40° Fahr., that of Moscow uring that month is about 20°.

Temperature.—The temperature of Edinburgh is in winter uch the same as that of London, but it is much lower an that of the latter in summer. Whilst in December e mean temperature of Edinburgh and London may both 40°, in July that of Edinburgh will be 58°, against ondon's 64°.

But Edinburgh has not, like London, a great river flowg through its midst, and producing those most disagreele fogs caused by a mixture of river-vapour, sulphur, and al-dust. Again, although the temperature is less than at of London in summer, the greater length of day we en enjoy enables crops to ripen quite as well in Midthian as in the South of England. On an average the day Edinburgh in June is 53 minutes longer than in London, July 48 minutes, and in August 27 minutes.

Rainfall.—As the winter temperatures of London and linburgh are practically identical, so there is little differce in regard to their mean annual rainfall, which is about inches. Both capitals belong to that dry, bracing east coast border of Great Britain, which contrasts with the west coast as regards rainfall and general humidity. The further west you go in Britain the wetter and more relaxing the climate becomes. Whilst at Edinburgh you will measure 25 inches of rainfall per annum, at Glasgow you will measure 43, at Greenock 61, and at the head of Loch Fyne 127.

But just as you observe the rainfall increasing if you ascend a river towards the mountains among which the river springs, so when you leave the city of Edinburgh and ascend the spurs of the Pentland Hills to the south, you find the rainfall rising also. I have stated the city rainfall at 25 inches per annum. This is at a height of 200 feet above the sea. Leaving the city and ascending southwards to 555 feet, at Swanston, we find the rainfall to be 34 inches; at Clubbiedean (780 feet), 38½ inches; and at Colzium (1000 feet), 42½ inches, or nearly as much as Glasgow.

R. Richardson.—"Physiography of Edinburgh," *Scottish Geographical Magazine*, July, 1902.

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The Castle Rock, Edinburgh

The action of frost may at any time rend the hardest rock. The rock on which Edinburgh Castle stands is a particularly hard igneous rock, yet nearly every year the War Office employs men to remove the blocks and fragments which have been split off it by the action of frost. The basalt of which the Castle Rock is composed is excessively hard, but it is also jointed, and during winter water filters into the joints and becomes frozen. The expansion caused by the conversion of water into ice bursts portions of the basalt asunder, and when a thaw comes a heap of fragments marks where Frost, the quarryman, has been at work. As this process has been going on ever since the Castle Rock was exposed to the atmosphere, we can dimly imagine the enormous loss of rock to which the mass

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EDINBURGH ROCK AND CASTLE, SEEN FROM PRINCES STREET GARDENS.

has been subjected. The area of the Rock at present exposed to the atmosphere measures about 700 feet by 800 feet, with an elevation of 200 feet. I have ascertained from the contractor employed by the War Office that, on an average, he annually removes 45 tons split off the Castle Rock during winter. So that ever since the comparatively recent time when Prince Charlie appeared before the Castle in 1745, and vainly summoned it to surrender, the Rock has been reduced in size by no less than 7065 tons. It will take, however, on the above calculation, more than 150,000 years before the action of frost can remove the Castle Rock altogether.

RALPH RICHARDSON, F.R.S.E.—*Scottish Geographical Magazine*, July, 1902.

By permission of the Author.

The Harbour of Glasgow

Little more than a hundred years ago high-water was hardly perceptible at Glasgow—it came up an insignificant ripple; now there is an 11 feet range of tide, and a good deal of the depth has been obtained, not by the raising of the high-water mark, but by dredging out the bottom of the channel, which is now virtually level from the Broomielaw to Port Glasgow. The tide—such as it was—at Glasgow 100 years ago was three hours later than at Port Glasgow; it is now only one hour later. In 1840 an Act was passed authorizing the deepening of the harbour and river throughout to at least 17 feet at neap tides, and laying down lines for future widening. The greatest natural obstacle proved to be a rock at Elderslie, discovered by the grounding of a ship in 1854, and extending across the river and for nearly 1000 feet of its length. It cost £70,000 to cut through this trap reef to a depth of 20 feet below low water, and its final removal has only recently been accomplished. To-day vessels of 27-feet draught freely traverse the river; one drawing 28 feet lately accomplished the trip a single tide, and widening and straightening of the nnel have kept pace with deepening, to the immense provement of navigation.

ort Glasgow owes its existence to the commercial spirit l enterprise of Glasgow merchants, who bought 13 acres land in Newark Bay in 1668, laid out the ground for a n, and built a harbour. It was made a free port and principal Customs station on the Clyde. But its remacy as a shipping centre terminated with the waken- of Greenock and the deepening of the Upper Clyde.

Neil Munro.—*The Clyde.* A. and C. Black, 1907.
By permission of Messrs. A. and C. Black.

(*d*) THE UPLANDS

The Southern Uplands

The Southern Uplands, with an area of 4185 square es, contain 278,000 inhabitants, about 25 to the square ometre (approximately 66 to the square mile). The ion, which is mountainous, is thinly peopled. Never-less, there is a relative concentration of the population the Southern Uplands, for 25 per cent. of the inhabitants Scotland occupy only 15 per cent. of the country. This first sight somewhat abnormal fact is explained by the ximity of England and the slow infiltration of the glish.

The country is mountainous. Numerous chains of hills, h as the Cheviots, Lowther Hills, Moorfoots, Lammer- ors, etc., extend in parallel lines, constituting the nants of the Great Caledonian Chain, now in large part rn away. Further, the altitude is moderate. The eviots do not exceed 813 metres (2682 feet), and the minating-point of Southern Scotland, Mount Merrick, the Lowther Hills, only reaches 845 metres (2788 feet). this height in Germany, Austria, and Switzerland im- tant human settlements exist, but here the latitude

(55° to 56°) accentuates the effect of altitude. In combination with the abundance and continuity of precipitation, and the consequent humidity of the air, the latitude hinders cultivation, and gives up all the summits to barren heather and all the valleys to peat-bogs. Many districts are completely uninhabited. While in the Alps permanent habitations are found at a level of 2000 metres (6562 feet), and in many places even beyond this limit, in the Southern Uplands, Leadhills, the highest village of Great Britain, is not more than 450 metres (approximately 1485 feet). Towns have only been established at strategic points; they are the old fortresses of the Scottish frontier, of that Borderland disputed for centuries between Scots and English. Such are Selkirk and Roxburgh, which have never emerged from their condition of large villages, in spite of their position as capitals of counties.

The eastern coast roadway forms the easiest passage, and the one which has been longest known. It is the great historic road between Scotland and England. It profits also from those fertile plains which the eastward-draining streams have multiplied in Scotland on the borders of the North Sea, plains which are wanting on the Atlantic seaboard. On these plains immigrants have established themselves, so that the population, in which English immigrants dominate, has attained round Berwick, North Berwick, Eyemouth, and Dunbar, a density per kilometre of 100 (approximately 264 to the square mile).

Another fact worthy of note is the consequence of the convex curve towards the east which the Scotch coast takes. It has been necessary to shorten the road towards the fertile and populous Lowlands by cutting across the mountains. From this fact has arisen the importance and peopling of the road which, setting out from Berwick, leads directly to Edinburgh and Glasgow. Along this road, which mounts the narrow valley of the Tweed, agriculture has been impossible; but industry, favoured by the proximity of the cornfields of the Lowlands, has established

self. All the towns are industrial in type. Centres of
cent origin, such as Galashiels and Hawick, have already
spectively 12,804 and 17,303 inhabitants, owing to the
xtile industry. Berwick, alike a station on the coast
ute and the terminus of the mountain route, has naturally
ecome the metropolis and the most populous town of the
gion.

On the western coast Port Patrick and Stranraer are the
oints at which land the numbers of Irish who come to
cotland, either as temporary immigrants at harvest-time,
with the intention of establishing themselves perma-
ently in the country.

The routes—much frequented and densely populated—
hich constitute the shortest road between England and
he Lowlands cut across the mountains, and utilize the
arallel valleys of the Annan, the Dee, and the Nith. By
his route passes the railway from London to Glasgow. At
he extremity of these valleys the ports of Annan, of Kirk-
udbright, and Dumfries constitute points of entry and
xit for merchandise. In addition, their southern exposure
nd their situation at the foot of the mountains, which
helter them from the cold and damp winds, has rendered
hem towns of baths.

From an article by M. PAUL PRIVAT-DESCHANEL, *Scottish Geographical Magazine*, November, 1902.

By permission of the Royal Scottish Geographical Society.

BAHADUR ARCOT [illegible] MUDALIAR'S
HIGH SCHOOL
BANGALORE.
ESTABLISHED
SEPTEMBER 1873.

III.—THE PENNINES

Denudation of Surface Rocks: the Pennine Chain

THE contrast between the south-east and the north-west of Britain, between the plains and low coasts towards the Continent, and the cliff-edged uplands of the oceanic border, with all the resultant differences—agricultural, industrial, racial, and historical — depends on a fundamental distinction in rock structure. In the south-east are sands, clays, friable sandstones, chalk, and soft limestones. In the north and west the sandstones are for the most part hard and gritty, often so hard and compact as to become quartzite; the clays have been pressed into slates; the limestones are crystalline, sometimes becoming marble; and igneous rocks abound, which, together with the sediments, have often been crushed into schists and gneisses. In Britain, but not in all parts of the world, the harder rocks are the more ancient, and, despite the lapse of time, they still rise into uplands and into peaks, while the newer softer deposits of the south-east have been reduced to lowlands in a comparatively short geological time. Wherever borings, whether for water or coal, have been carried to sufficient depth through the clays and chalk of the south-east, these deposits have been found to rest upon a floor of older rocks, which, alike in texture and contained fossils, are identical with those exposed in the northern and western hills. The material of the lowlands has been derived, in the process of ages, mainly from the decay of the north-western uplands, but to some extent from old upland districts now denuded and partly buried beneath the newer rocks.

Nowhere is the relation between rock structure and surface form more simple than in the Pennine Chain, the moorland range which occupies the central belt of the isthmus connecting North with South Britain. It consists of three series of strata: first and lowest is the Mountain Limestone; covering the limestone, and therefore deposited later, is the Millstone Grit; uppermost, and therefore most recent, is the great series of clays and flagstones, with occasional seams of coal, which are known as the Coal Measures. The whole carboniferous series — Limestone, Grit, and Coal Measures—is many thousand feet in vertical thickness, and must have been laid down during long centuries in nearly horizontal strata. Subsequently irresistible forces, acting from east and west, caused the rock-layers to arch upwards into a great fold, striking north and south for 200 miles. As the ground rose into the rains and frosts of the upper air, the crest of the fold was planed down, so that the older rocks, forming the core, came to be exposed along the central line of the denuded arch; while on either hand, to east and to west, the flanks were formed by the cut edges of the upper strata. Thus the beds of coal which were once continuous across most of the North of England have been removed from the top of the Pennine upfold, and divided into Yorkshire and Lancashire coal-fields. Even the mountain limestone has been laid bare along parts of the axis.

H. J. MACKINDER.—*Britain and the British Seas.* The Clarendon Press, 1907.

By permission of the Author.

The Yorkshire Coal-Field

The Coal Measures crop out in two distinct areas in Yorkshire. There is a small outlier on the down-throw side of the Craven Faults at Ingleton, extending to some

15 square miles, and the main body of the formation, occupying probably quite 500 square miles, out of the nearly 900 square miles of outcrop of the great Yorkshire, Derbyshire, and Nottinghamshire coal-field. This field is by far the largest in England, though it is exceeded by the South Wales coal-field; but it cannot be doubted that Yorkshire contains an area of available coal-bearing strata exceeding that to be found in any other county.

The thickness of the measures in the Yorkshire coal-fields, 5000 feet, is very nearly a mean of that attained in other parts of Britain—neither so great as the 12,000 feet of South Wales, nor so small as the 2000 feet of the Northumberland and Durham coal-fields.

In general character the Coal Measures of Yorkshire conform to the type prevailing in the centre and north of England; they consist chiefly of shales, grey to black in colour, and generally very distinctly laminated. Besides the shales are occasional beds of sandstone, ironstone, underclay, and last, but most important, the coal-seams themselves. . . .

There are in the Yorkshire coal-field about thirty seams of a workable thickness. It is necessary to say "about," because what constitutes a workable seam is a matter of the state of the market, the facility of working, and the quality and associations of the coal. Depth from the surface and the cost of winding will also affect the definition of a workable seam.

At times a bed of ironstone occurs in such proximity to a thin seam that the two can be won together at a remunerative rate, and more commonly a bed of fire-clay (at its best the most valuable mineral raised in this coal-field) may be found underlying the seam, when the like economy of working can be practised. The higher limit of thickness of a seam is more easy of definition. The great Barnsley bed, the richest seam in the coal-field, reaches to 8 feet, 9 feet, and even in one colliery to 10 feet. A thin seam is defined as being less than 3 feet in thickness. It may be mentioned here that the annual output of coal from the Yorkshire field is about 29 millions of tons. A first-class colliery, such as Cadeby, near Doncaster, may raise from 1 million to 1½ million tons per annum. The haracter and quality of the coal-seams vary as much as he thickness. There is no coal anywhere within 100 miles of Yorkshire which is in any degree anthracitic. . . .

The seams are often very uniform in thickness, and may sometimes be traced over enormous areas. Thus the Silkstone seam of Yorkshire has been identified with the Arley Mine of Lancashire, and if this correlation be correct, it nust have extended over an area of at least 5000 square niles. . . .

Article by PROFESSOR P. F. KENDALL, "Yorkshire," *Victoria County Histories*, vol. i.

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Geology of Lancashire

The geology of Lancashire is of such a character that robably no other county in England can so well show the nercantile development due to its mineral wealth. The urness and Ulverston districts, with their rich deposits, ave furnished an abundance of iron-ore, and the rich oal Measures which cover a large portion of the county ave alone rendered possible the creation of huge manuacturing towns, crowded with factories and workshops; hile the low Triassic plains, with overlying superficial eposits, which form the seaboard from Liverpool to Fleetood, yield a soil well adapted for agriculture. The arboniferous Limestone and Millstone Grit are admirably tted for road-making and building purposes, and many of he shales and under-clays associated everywhere with the oal, and the thick layers of boulder-clay, are equally useful the manufacture of bricks and coarse pottery. Many of e large towns are crowded so closely together as to be lmost continuous, and it is no fanciful figure of speech to say that at least the southern half of Lancashire is one great workshop.

H. Bolton, F.R.S.E.—"Lancashire," *Victoria County Histories*, vol. i.

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Derbyshire

"The agricultural character of the county of Derby is as varied as its surface, and is to be found in all its varieties, from the rich meads on the bank of the Trent, the Derwent, the Wye, and the Dove, to the scanty herbage on Kinder Scout, Axe Edge, and Combs Moss, and from the productive red marl and gravel in the arable district south of Derby, or from the occasional patches of red loam upon the Coal Measures more northerly, to the sterile limestone in the north-east, and the cold, thin hillsides on the north-western corners of the county."

Thus writes Stephen Glover in his History of Derbyshire seventy-five years ago, and no better description of the county could be given to-day. Grand scenery and prosperous farming are seldom to be found walking hand-in-hand, and necessarily so. What is possible in the lowlands, where the fields are flat and many-acred, and therefore to the artistic eye comparatively dull and uninteresting, is not possible in the highlands or Peak District, where the land is mountainous, rocky, and windswept, and where, too, winter loves to linger far beyond its legitimate time. In addition to this, much of the eastern side is more given to the raising of coal than the raising of crops or the growing of grass.

The Peak.—The north of the county, usually known as the Peak District, has been hitherto somewhat cut off from the south, as much, perhaps, by the mountainous character of the land as by its lack of railways, and thus the people are singularly different in their habits of farming, as they also are in much of their language and customs; but though his is so, it is not easy to draw the exact line of demarcaion between the north and the south, and to state exactly here one ends and the other begins. It is a very noticeble fact, however, that the character of the land and of the ian who farms it begins to be somewhat different about he neighbourhood of Wirksworth, and the observant raveller will notice that every mile he travels southwards rom that town the aspect of the county is gradually altering, hat the limestone and gritstone walls are giving place to edges and ditches, and the hillside farms, with their small nclosures, to the larger and flatter fields of the south.

That most northerly portion of the Peak District which s closed in by Cheshire and Yorkshire, and of which Glossop forms the centre, resembles that part of Lancashire nd Cheshire near which it is placed far more than Derbyhire. Its chief industry is rather cotton than agriculture. t is also more closely in touch with Manchester by means f the railway than with any other town in the county, rom which it is singularly cut off. The small amount f land which is not moor is mostly pasture, and not till dale is reached do we arrive at any district which is aterially helped by the railway. The land here which s under cultivation lies on Yoredale shale, and is cold and eavy in character, and practically all grass.

East Derbyshire.—In the centre of the eastern portion f the county stands Chesterfield, which town may be taken s fairly representing the centre of the Derbyshire coal listricts. The effect of working underground and raising oal is somewhat detrimental to working above ground and aising a remunerative agricultural crop on the surface, and s the coal-mines most undoubtedly mar what would otherwise be beautiful scenery, so also they mar in various ways he productive nature of the land.

The vale of Scarsdale, which represents much of the listrict of which Chesterfield is the centre, was always oted for the fertility of its soil, no less than for the beauty f its scenery. This is not surprising considering the lie of the ground and the nature of its soil, which is found to be well favoured and productive, and, moreover, is well watered by two rivers—the Hipper and the Rother—to say nothing of the canal, which traverses 46 miles of country on its way to the Trent, and a brook called the Amber, which flows into the Derwent.

South Derbyshire.—All the south part, of which the county town forms the centre, like the rest of the county, owns but few large landowners. The land is more sheltered both by the trees and by the natural lie of the ground. It is well watered by the Derwent and the Trent, and by several small streams. Very little cheese or butter is made, the milk from the dairy farms being sent to Leeds, Bradford, Manchester, Scarborough, and, of course, London.

On the east, or Nottinghamshire, side the coal district extends below Ilkeston and covers a large area, yet the land produces good hay and pasture, and a considerable amount of corn is grown.

The extreme south of the southern, or Leicestershire, side, which forms a spur between the counties of Leicester and Stafford, is well watered by both the Trent and Derwent, as well as by the Great Trunk Canal. It contains some of the most productive land in the county, which is mainly given up to the growing of corn and roots, though there is some rich grassland, especially near the rivers.

C. E. B. Bowles, Esq. — "Derbyshire," *Victoria County Histories*, vol. ii.

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The Peak of Derbyshire

The term Peakland may be limited to the region of the High Peak Hundred of Derbyshire and the Wapentake of Wirksworth, to which the name Low Peak Hundred has sometimes been given. The district thus defined includes the high moors at the northern end of the county, with the whole of the Peak Forest, the valleys of the Wye and the Upper Derwent, as well as the eastern bank of the Dove in its upper course—that river separating the counties of Stafford and Derby the favourite resorts of Castleton, Buxton, Bakewell, Chatsworth, Haddon, and Matlock, and nearly the whole of that river scenery for which Derbyshire is everywhere celebrated. Its boundaries are conterminous with those of the county on the west, north, and north-east, where it is separated from Staffordshire, Cheshire, and Yorkshire.

* * * * *

The scenery of the Peak of Derbyshire is that which generally characterizes the Millstone Grit and Limestone formations. That of the grit is stern, sombre, and wild, with a certain grandeur of which the other is often destitute. The valleys are comparatively wide, and are generally wooded on their slopes, and the hills are crested with level terraces or edges of the rock, broken up into huge masses, and dark and much weather-worn, as in the Millstone Grit scenery of Yorkshire. From the slopes below they have the aspect of bastions, and one may well fancy that some Titanic defenders of old hurled down upon their assailants the broken blocks which are now to be seen in the valleys. The limestone hills, on the other hand, are rounder in their outline, and do not attain the same altitude. Their steep or perpendicular escarpments of rock are generally at the base of the slopes, frowning upon the rivers, and sometimes weathered to singular shapes; and their broken surfaces have assumed a pleasing colour, for they have given roots to mosses and ferns, and are often overhung with greenery. Yet in the scenery, both of the Millstone Grit and the Limestone, we have the same great uplands, rolling and undulating in open fields, or heath-clad moorlands, almost destitute of trees, through which the streams, coming down from their gathering-ground in the hills, have carried on by erosion the work that convulsion often began, leaving us lovely valleys.

JOHN LEYLAND.—*The Peak of Derbyshire*, 1891.

By permission of Messrs. Seeley and Co.

Derbyshire's Rivers and Hills

Derbyshire is a county of contrasts—the northern half a land of hills and moors and green dales, the southern a land of pleasant meadows and broad champaign. The Trent,

> "Who like some earth-born giant spreads
> His thirty arms along the indented meads,"

flows from west to east and bisects this southern portion, receiving the waters of all the principal rivers and streams of the county. The little Mease, Leicestershire-born, joins the Trent at Croxall, after forming for a few miles the south-west boundary. At Newton Solney, near Burton, the Dove—"Princess of Rivers," as Charles Cotton calls her—who keeps the boundary between Derbyshire and Staffordshire during the whole of her sparkling course, loses herself in the larger stream. At Wilne, near the south-eastern corner of the shire, Derbyshire's chief river, the Derwent, which has flowed through the centre of the county, swells the Trent. The Dove rises on the south-eastern slope of Axe Edge, near Buxton, but its chief tributaries are all cradled on the Staffordshire hills. The Derwent has its springs on the Langsett Moor, below Bleaklow Hill on the Yorkshire border, and brings down to Trent the waters of many a score of breezy uplands. . . .

There are, indeed, three Derbyshires. The first is the Derbyshire of the Trent valley, including therein all the county south of Trent and the large tract lying north of it to an imaginary line, drawn from the Dove, near Ashbourne, through Belper to the Erewash valley at Codnor and Heanor. Most of this is purely agricultural land, rich in tilth and fruitful of corn in the old days—Derbyshire Felix, as it used to be called, in distinction to Derbyshire Deserta, the Morelands or Moorlands of the Peak. . . . The second Derbyshire of our division covers the Peak District in the idest extension of the term, and takes in the whole of the ounty lying north of Ashbourne and Belper and west of ie Derwent. This includes the Glossop moors, the desolate inderscout region, the vale of Hope, Buxton and the ye valley, Bakewell and Chatsworth, Matlock and irksworth, and Dove Dale on the western side. The ird Derbyshire comprises all that lies to the east of the erwent looking towards the Bradfield and Hallam moors nd Sheffield in the north-east corner, and then farther outh across the east moors to Chesterfield, and still urther south to the industrial districts of Alfreton and inxton.

. . . The highest hills lie in the north-west corner, and orm part of the backbone of England—the great Pennine ange. Kinderscout, near Hayfield, rises to 2088 feet; xe Edge, near Buxton, to 1756 feet; Bleaklow, near lossop, to 2060 feet. These are the giants of the High eak, not very tall, it is true, compared with real mountain iants, but imposing and dignified enough while one is in heir company. Other horizons, other hills. When we are n the Peak of Derbyshire we do not ask for anything rander or more sublime than the scene which Nature has pread before us,

> "Among the moody mountains, where they stand
> Awed with the thought of their own majesty."

But the distinguishing feature of the "Derby hills that re so free" is the long ridge or *edge*, a bold outline of ontinuous high ground dominating a valley. Even Kinderscout is a ridge of this character, frowning down over purple moors and black, treacherous swamps. Sometimes they simply rise out of the plain, and form big barriers with no special feature save their bulk. That is the impression which edges like those of Longstone and Rushup leave upon the mind—guardians protecting their valleys, but with no grace of woods adorning their bare sides. But thers are jagged and broken, with fantastic buttresses and pinnacles of rock projecting skywards, and their slopes are strewn with boulders in token of ancient convulsion. Such are Froggatt's Edge, Gardom Edge, Birchin Edge, Derwent Edge, Middleton Edge, and a score of others. Derbyshire, indeed, has very few real hills standing in conspicuous isolation from their fellows.

. . . Of the Derbyshire dales one cannot speak in terms of too much praise. Some are broad and stately valleys girt round by hills, with smaller valleys radiating from them, little towns and villages set in their midst, and cultivated farms upon the hillsides. Of these the Vale of Hope, from Castleton to below Hathersage, is at once the largest and most beautiful, while Darley Dale, from Rowsley and Stanton to Matlock and Riber, possesses claims just as sure to second honours. . . . Of the rocky dales, where little or no room is left for tillage, and the beauty of the scene depends wholly upon the river gorge and its rocks and woods, Dove Dale, from Thorpe Cloud to Hartington, stands without a peer.

. . . Other dales are dry clefts in the limestone. Should you tire of the valleys, and desire to breathe a larger air, the moors are never far distant—moors gloriously open and grand. North of the Dove and Chinley Railway, stretching away from the old Manchester and Sheffield road, through Chapel-en le Frith, Castleton, and Grindleford Bridge, spread the wildest moors, with the great towering mass of Kinderscout heavily seated upon them between Edale and Glossop. They slope across the Langsett Moors in unbroken grandeur towards Penistone—the bleakest region in all England—and over Stanage Edge and the Rivelin Moors to Sheffield. . . .

These are the real moors of heather and bracken which flame with brown and yellow and purple in the autumn. The name is also given in Derbyshire to barren, treeless tracts, covered with thin herbage, stony and desolate, or even to reclaimed moorland, enclosed and girt with grey stone walls. About a century ago thousands of acres of at commons were thus enclosed in Derbyshire, and ame of moor still clings to them.

B. Firth. *Highways and Byways in Derbyshire.* Macmillan.

By permission of Messrs. Macmillan.

Kinderscout

yfield is one of the most convenient places from which proach the wildest districts of the High Peak. That —often taken in vain farther to the south—belongs to ller tract of Derbyshire than is generally supposed by who have not looked closely at the map. If arbitrary daries must be named, we should say that it was ded on the north by the line of the Great Central way from Glossop to Penistone, on the east by the s of moors and edges between Penistone and Ashopton, e south by the Dore and Chinley Railway, and on the by the roads between Chinley and Glossop. In the e of this area, some 20 miles by 10, rises a ing mountain mass with broad moors stretching on every side, and disjointed hills and ridges set ly upon them. The mountain mass is Kinderscout s or simply Kinderscout, the name of one particular ry being often applied to the whole. There is no Peak proper in the sense that Mount Everest, or even wdon, is a peak. Kinderscout Moss is a lofty plateau. ape an irregular parallelogram with fantastic deviations, presenting to the eye, as you approach it from any one the usual Derbyshire edge.

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J. B. FIRTH.—*Highways and Byways in Derbyshire.* Macmillan.

By permission of Messrs. Macmillan.

Kinderscout

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When distance softens the lines of these edges, and gives a smooth, rounded look to what in truth is pointed and agged, the higher eminences of the Moss stand up like eaks, but the name itself is a curious misnomer. Or, if the learned philologists are right and the word peak in this onnection does not signify a pointed hill, the name of High Peak is unfortunate, because it inevitably gives rise to false impressions. This great plateau is some 5 miles in length, and in width varies from 1 mile to 2 at its western extremity. It is covered with peaty moss and heather, intersected by little ravines and patches of bog—a desolate tract where it is well to know the way without possibility of going wrong, and well to be sure of your sky before you venture. Even on the moors of its lower slopes are certain fearsome patches. No place gets the name of Featherbed Moss or Black Moss for nothing. Such words on the map should act like a danger-signal to the wary.

The Moss, and indeed most of the High Peak—which is not crossed by a single highroad except diagonally from Glossop to Ashopton—is private, save for a few footpaths.

J. B. FIRTH.—*Highways and Byways in Derbyshire.* Macmillan.
By permission of Messrs. Macmillan.

Caves of the Peak District

Among the remarkable features of the Castleton district are the wondrous caverns, by which, perhaps, more even than by its possession of "Peveril's Place in the Peak," it is distinguished. Unless the wayfarer has visited the Mammoth Cave of Kentucky, he will find no disappointment in the caverns of Castleton, which for grandeur and wild sublimity have no equal in England, though the smaller stalactite caves of Cheddar may rival them in beauty. The whole limestone formation of the peak has been subjected, since its deposition, to contortion and wasting by successive volcanic action, disruption due to shrinkage, and the erosion of water, to which causes, severally or in conjunction, the formation of the huge underground vaults is due. There can be no doubt that the stratification of the district is almost everywhere deeply fissured, and there is reason to believe that the main caverns communicate with one another.

A fissure of the Windy Knoll quarry at the top of the innats was opened in 1870, and has since been further plored, with the result of disclosing the remains of bison, indeer, roe-deer, grizzly bear, wolf, hare, fox, bat, and me of the rodentia.

The great caverns are three in number : Peak Cavern, the Devil's Hole ; the Speedwell Cavern, and the Blue hn Cavern. That which is ascribed—not unfittingly if e regard its awful character—to the devil extends its ries of vaults about 2300 feet underground, and is said be some 600 feet below the surface of the mountain. It approached by a dark pathway in the limestone cliffs, hich rise more than 200 feet, clothed with rough growth nd brushwood, in which jackdaws and other noisy birds ave their home, and crowned by the grey Castle of the eak. Almost at the mouth of the cavern—which is a uge natural archway 120 feet in width, and nearly 40 feet igh—the Peak's Hole water bursts impetuously, and often no inconsiderable volume, out of a fissure in the rock, fter its long, dark journey through the limestone.

As the pilgrim to the underworld proceeds, the pathway eads down, and the roof grows lower, and at every step he light fades more and more, until, entering the actual egion of the caverns, it is lost altogether. Then the uides, with candles, conduct him in a stooping posture own a pathway some 30 yards in length, from which he nters the "Bell House," a rocky chamber deriving its name from the bell-shaped hollows in the roof. Now the wayfarer traverses a passage which has been opened by blasting through the rock, and arrives at Pluto's Hall, where the noise of waters is like to break upon his ear. This great cavern is said to be 220 feet square, for it is an irregular quadrangle, and as much as 120 feet high, so that it is well to be provided with Bengal lights, or some better means of illumination than the feeble glare of candles. A few steps are now descended to the spot whence the sound proceeds. This is the "Second Water," which makes its way with a rumbling noise among the stones ; and near by are some detached rocks, to which the name "Roger Rain's House" has been given—the fancied dwelling-place of the genius of this dripping vault. The pilgrim then ascends to the "Chancel," of which the walls are encrusted with glistening stalactites, and passes on to the "Devil's Kitchen," where the waters are heard roaring in hidden channels through the rocks Shortly after the cavern contracts, and soon there is space only for the stream. This water is believed to disappear from the surface through a "swallow" on the Buxton Road, about 3 miles away, and then, passing through the Speedwell Cavern, to find its way through the Peak Cavern or Devil's Hole into the valley of the Noe.

John Leyland.—*The Peak of Derbyshire*, 1891.
By permission of Messrs. Seeley and Co.

IV.—NORTHUMBERLAND AND DURHAM COAL-FIELD

Rivers and Valleys of Northumberland and Durham

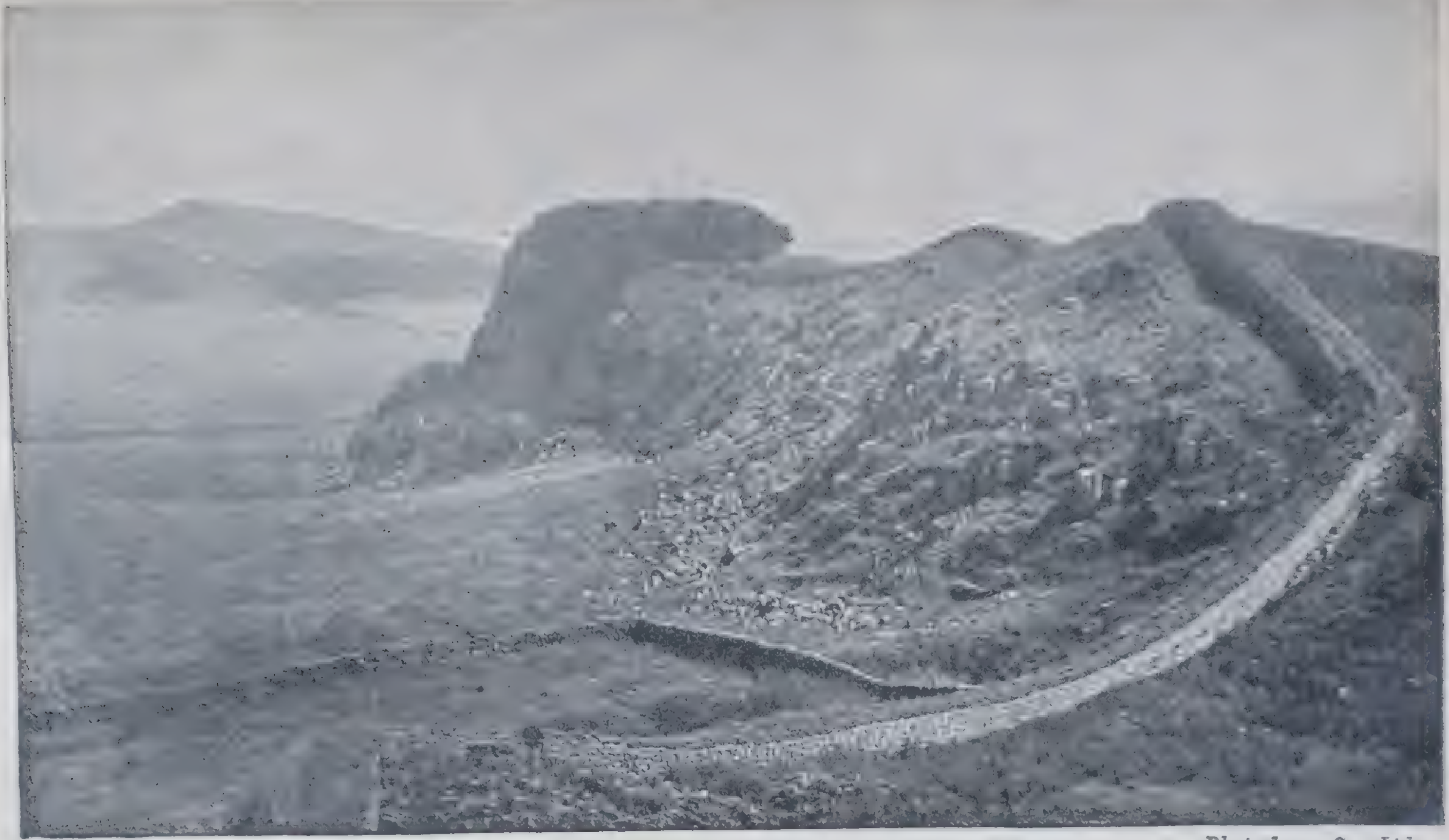
IE main pre-Glacial valleys of the Tweed, Tyne, Upper ear, and Tees are broad, and the drift which now partly isks them has been levelled out, so that they have become e easiest and busiest routes for the lines of east and west man movement in the North of England, and the chief ices of settlement have been fixed along them. Thus ltwhistle lies at the junction of the pre-Glacial "Tyne- ip" and the South Tyne, Hexham at the junction of e Tyne and North Tyne, while along the valleys of ese rivers numerous towns and villages have been ected. . . .

The next cycle of river development commences with e passing away of the Ice Age. The ice filled up the ijor existing valleys and checked their development ; it so carried with it the screes lying at the foot of the carpments, which were rounded and polished and made ss distinct features. Along the valleys little or no denu- tion had been done by the ice, and, except that it had oothed their sides and rounded off the irregularities of eir contour, it had not altered their course. During the riod of maximum glaciation there were several ice-flows ssing over the two north-eastern counties, which, while ore or less distinct on the higher ground, gradually erged together on the lower. One swept round the

Cheviots from the South of Scotland, and passed southward over the coastal region of Northumberland and North-East Durham. Another crept across Northumberland from the west, filled up the Tyne valley, and passed southward over Central Durham. A local one moved down the South Tyne and united with the last. The Wear and Upper Tees formed separate gathering-grounds of their own, while the ice from the Eden valley and the Lake District passed over Stainmoor and then down the valley of the Tees. All the main streams—viz., those from the South of Scotland and Western England, and those down the main river valleys—received a southerly component due to the pressure of the main ice occupying the North Sea, which came very near to, although it probably never reached, the coast of either Northumberland or Durham. Many of the valleys of the Cheviots, and some of those tributary to the Tyne, were not filled with ice, and hence glacier lakes were formed in them, and the overflows from these have eroded, deep, clean-cut, and often quite dry channels across watersheds. Many such slacks occur on the Cheviots, and on the higher ground between the Allen, Tyne, and Derwent.

Also at the end of the period of glaciation the ice appears to have melted from certain districts over which no main sheet was passing, as that of Central Northumberland, quicker than it did along the country covered by the main iceflows; and hence ice-dammed lakes occupying large areas were formed, and overflows from these have cut channels across the minor watersheds on the lower ground. Some of the dry slacks occurring on the coal-field to the north-west of Newcastle are of this nature, and the gap in the Magnesian Limestone escarpment at Ferryhill, through which the North-Eastern Railway runs, was also produced in some such manner as that here stated.

After the Glacial period the main valleys formed prior to that time were partly, and many of the minor valleys entirely, filled with boulder clay and other superficial deposits.



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HADRIAN'S WALL.

Built in the second century from the Tyne to the Solway to keep out marauding hill-tribes.

little or no evidence of their existence being left on the contour of the country. The new rivers of the post-Glacial epoch began to carve their valleys under new conditions, on land already partially eroded, but standing at a lower level than in the former cycle of river development, and on a new platform of denudation consisting of rock and boulder clay. The valleys of the higher reaches of the pre-Glacial streams which had not been entirely obliterated by the mantle of drift became the natural waterways of the new era; but as they were partly filled up, new channels had to be cut, and hence a great thickness of the original superficial deposits has been removed or reassorted. The river terraces of the Tyne and the Wear, which are found in the former river valley as high as the 300 feet contour line, were produced from the drift that once filled it up to and above that level. Another consequence of this denudation of the glacial formations is that the Tyne, Wear, and Tees have, in many places along their course, and for longer distances, wide haughs formed of reassorted drift. The rivers are manifestly not carving out new valleys, but superposing a new watercourse on an older one of larger, broader, and deeper dimensions. The wide alluvial flats have evidently had an important effect on the determination of the direction of the principal routes of commerce, and the situation of the towns and villages. The railways have been laid along the haughs of the post-Glacial streams. The Newcastle to Haltwhistle line follows the course of the Tyne, and its principal branches pass into the more secluded parts of the country along the pre-Glacial valleys. The North British branch from Hexham into Scotland creeps along the side of the North Tyne, and the Haltwhistle to Alston along the South Tyne. The main line from Darlington to Newcastle passes into the pre-Glacial Wear valley near Durham, and then along the "Wash" in Newcastle; while the Wear valley branch follows the course of that river right into the heart of Mid-Durham. Newcastle, Blaydon, Hexham, and Haltwhistle lie on the alluvial flats of the

Tyne; and Durham, Bishop Auckland, and Stanhope have een erected on those of the Wear.

* * * * *

The geographical position and commercial importance of Newcastle is due to the broad, flat, superimposed valleys of the Tyne, Derwent, and Team converging there. It is also of easy access from the boulder-clay flats of Cleadon and Fulwell. All the railways that enter Newcastle have been constructed without meeting with any important physical barrier. No tunnels and few cuttings have had to be made. The main roads running from that city are also of easy gradient, with the exception of those that climb the northern and southern flanks of the pre-Glacial rock-surface. On the other hand, the railways that enter Sutherland have met with physical obstacles due to the position of the Permian escarpment and the latter development of the Wear valley. They have all had to pass through cuttings or tunnels.

Another important effect of the Glacial period was that nearly the whole of the country was clothed in a mantle of drift, which has rendered the dependence of the drainage upon the geological structure much less pronounced to-day than it was before the era of glaciation. The surface deposits lay thickest along the ancient "washes," reaching a maximum proved thickness of 230 feet at Newton Hall, Framwellgate, 2 miles north of Durham city, in the valley of the Wear.

On the higher grounds some of the escarpments rise like islands from beneath the cloak of superficial deposits, and in Northumberland especially, on account of the ease with which water can be obtained at these places, this has had considerable influence in determining the position of the minor places of settlement. Many of the villages of Northumberland (especially those with the syllable "ing" in their names) are old settlements, and either stand on sand and gravel hillocks lying on the boulder clay, or on exposures of sandstone which rise above the uniform level of the surface formations. A large number of the pit villages, which are in many cases merely enlargements of the ancient settlements, belong to the latter class—*e.g.*, Killingworth, Widdrington, and Earsdon.

DAVID WOOLACOTT, D.Sc., F.G.S.—*Geographical Journal*, July, 1907.

By permission of the Royal Geographical Society.

Tweedmouth and Berwick

Tweedmouth sits upon the southern shore of Tweed, clad in grime and clinkers. Like a mudlark dabbling in the water but not cleansing himself in it, Tweedmouth seems to acquire no inconsiderable portion of its dirt from the foreshore. Engineering works and coal-shoots are responsible for the rest. Little or nothing of antiquity enlivens its mean street that leads down to the old bridge, and so across the Tweed into Scotland. The roofs of Berwick, clustered close together and scaling one over the other as the town ascends the opposite shore of the river, are seen, and away to the left that fine viaduct of the North-Eastern Railway, the Royal Border Bridge. But the finest view and the most educational in local topography is that gained by exploring the southern shore of the Tweed for half a mile in an easterly direction.

An unlovely waterside road it is true, a maze of railway arches spanning it, and shabby houses hiding all but the merest glimpses of Tweedmouth Church and its gilded salmon vane, referring to the salmon fishery of the Tweed, but leading to a point of view whence the outlook to the north-west is really grand. There, across the broad estuary of the Tweed, lies Berwick, behinds its quays and its enclosing defences. Across the river, in the middle distance, goes Berwick Bridge, its massive piers and arches looking as though carved out of the rock rather than built up of single stones. Beyond it, in majestic array, go the tall arches of the Royal Border Bridge, and in the background he Scottish hills. Tweedmouth, its timber jetty, its docks, nd its waterside lumber, are in the foreground. This, then, the situation of Berwick, for centuries the best-picked one of contention between the rival countries of England nd Scotland; the Border cockpit, geographically in the orthern kingdom, but wrested from it by the masterful nglish 750 years ago, and taken or retaken by or from tubborn Scots on a round-dozen of occasions afterwards.

It was in 1550, during the short reign of Edward VI., hat the existing fortifications enclosing the town were egun. The old bridge, built by James I., was the first eaceful enterprise between the two kingdoms; for although erwick for over a century had been recognized as a neutral r "buffer" state, peace went armed for fear of accidents, nd easy communication across the Tweed was not enouraged. There is food for reflection in comparison etween that bridge and the infinitely greater work of he railway viaduct. The first, bridging the river with ifteen arches, cost £17,000, and took twenty-four years o build; the railway bridge of twenty-eight giant arches, nd straddling the Tweed at a height of 129 feet, was built n three years at a cost of £120,000. The "Royal Border ridge," as it was christened at its opening by the Queen, as the appearance of a Roman aqueduct, and belongs to the tone and Brick Age of railways.

C. G. HARPER.—*The Great North Road.* Chapman and Hall, 1901.

By permission of the Author.

Along the Tees

In spite of the fact that, whether seen from the summit f Roseberry Topping, miles away, or at close quarters, Middlesbrough is a smoke-canopied, toil-stained town, no ne should explore whatever the river Tees has to show etween its source and its outlet without seeing it. Essenially a modern hive of industry—one of the workshops of the world—Middlesbrough is in reality a very remarkable place, worth studying on the spot. No one need expect to find old castles, old churches, or romantic scenes within its boundaries—where it stands to-day there was scarcely a house standing 100 years ago. Indeed, to people of this hemisphere the rise of Middlesbrough since 1820 reads more like a fairy-tale than a prosaic narrative; to Americans, of course, such a rapid creation of a great industrial centre would occasion no surprise. It was in 1829 that six enterprising gentlemen bought 500 acres of land on the south bank of the Tees for as many pounds as there were acres. On that land Middlesbrough arose. The first trade was in coal, but in 1831 a local man discovered iron in the Cleveland Hills, and, in company with his partner, established what is now one of the very largest steel factories in the world. And since then Middlesbrough, within 100 years nothing but a dreary flat on the banks of an undredged river, has become a fine town with 100,000 inhabitants, scores of miles of streets, a port into which ships of magnitude can enter, and a record of enterprise and hard work of which its people are justly proud. One should see Middlesbrough, if only to think of its blast-furnaces, its rattle and roar, its ceaseless striving, when one gets to the sources of the Tees on the Westmoreland borders, and remembers that the water which flows down the fell sides in such quiet surroundings will ere long sweep past this modern product of foresight and energy on its way to the North Sea.

On both sides of the Tees between Middlesbrough and Darlington there is much evidence of the prevailing industry of the district, and especially on the Durham side of the river.

The line of the Tees from the point where the river enters the North Sea as far as Croft Bridge, south of Darlington, exhibits some most extraordinary vagaries of direction, and twists and turns about, now north, now south. It hurries southward from beneath Stockton

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TEESDALE: HIGH FORCE.

a typically busy, coal-exporting place—as if it meant to run far into Yorkshire. Farther on, at Middleton St. George, it makes a still deeper cut into the county of broad acres, but at Sockburn incontinently changes its mind, and turns almost due north again.

* * * * *

North-west of Barnard Castle the scenery which surrounds the Tees becomes wilder and more varied in character. The Tees itself is, in its higher stretches, found hemmed in by rocky walls of fantastic shape, and at last falling, in awe-striking sublimity, over great shelves of limestone. Beyond Middleton-in-Teesdale the land becomes something of a solitude, rising into high moors and fells, which, as one nears the border, approximate to mountainous heights. There is a good story told hereabouts of a Southerner who, happening to find himself in these solitudes in company with a farmer, inquired of him how many sheep it was customary thereabouts to allow to an acre. "Eh! mon," replied the farmer, "thoo begins at t' wrang end: thoo shouldst ask hoo many acres gans ti a sheep!"—a reply which well characterizes the heathery and limestone aspect of the land on these far-off heights.

Middleton-in-Teesdale, where the line ends and the traveller enters the solitudes on foot, is a mining town, the centre of the lead-mining industry. It is chiefly notable to the traveller as the point from whence he must make his way to the famous waterfall of High Force, a few miles farther along the valley. The most convenient road to High Force is on the Durham side of the river, which, from this point onwards, is perpetually falling into miniature cataracts and over shelvings of its rocky bed. It grows wilder and more turbulent in character as High Force is reached, and, long before this really fine and impressive waterfall comes in sight, its roar becomes stupendous. Few English scenes of the same character impress one so much as this, when it is finally revealed to the eye in all its grandeur. Here, rushing between high walls of frowning ock, the Tees flings itself with thunderous sound in a vast mass of foaming water some 70 feet into a deep basin worn out of the limestone below.

Beyond this point westward all is river, crag, moor, and ell.

J. S. Fletcher.—*The Enchanting North.*

By permission.

The River Tyne

To those people who have only seen the river Tyne from the three great bridges which connect Gateshead with Newcastle its very name can be suggestive of nothing but grinding industrialism, carried on in a prevailing atmosphere of gloom and grime. Ever since the age of steel and steam dawned upon us the Tyne and Newcastle as names have been synonymous with prodigious efforts in the way of human enterprise, human perseverance, human achievement. When one speaks of the Tyne one thinks instinctively of such men as George Stephenson, of such workshops as Elswick, of such busy receiving and distributing coal centres as Jarrow. It seems impossible to conceive of the Tyne as being anywhere a river of beauty, a stream by which to wander. But in point of fact it is one of the most attractive rivers in England, and traverses some exceedingly interesting country, as anyone may discover for himself who follows it from its outlet into the North Sea to its sources in the western hills. Its course lies amongst country which is wild and romantic, pastoral and picturesque, past ancient castles and houses, and through more than one old town of historic association. The Tyne is, in brief, one of our *great* rivers, with the dignity and importance of the Thames, the Severn, and the Ouse.

Jarrow is now one of the busiest and blackest of the Tyneside towns, wherein industry is always to the fore. It is devoted to coals and chemicals, and at first no one would think that it was anything but a very modern town indeed. It is, however, one of the most ancient centres of ecclesiasticism in England, and famous all over Christendom as having been the almost lifelong home of the Venerable Bede.

It must have been a very different Tyne upon which the monks of Jarrow were wont to look to that which one sees nowadays between Jarrow and Newcastle. Shipping of all sorts and sizes, steam, smoke, the vapours of chemical works, the reek of glass furnaces, the thousand and one odours which come from manufactories and workshops, a perpetual canopy of dun-coloured atmosphere overhanging and dominating all; the clank, clatter, and clang of steam-hammers, coal-shoots, and iron beating on iron; the air of ant-like activity on all hands—these are the things which strike eye and ear on this stretch of the river. At night, when furnaces and chimneys belch forth flame and smoke made lurid by flame, the imaginative man might well fancy himself to be in the midst of an Inferno as he sees the black waters of the river reflecting the glare above.

Modern hive of industry that it is, there are few of the great manufacturing towns of England so well worth visiting as Newcastle. Modern as it looks now in its newer parts, Newcastle is in reality a very ancient town. Here Hadrian built a bridge over the Tyne early in the second century, wherefrom the place took its Roman name, Pons Ælii. The castle, like many another in the north, owed its inception to the direct command of William the Conqueror, who, after laying waste the then existing town, caused it to be built on the most commanding site, and placed in it a strong garrison. From this, the new castle, the town which gradually sprang up around it, took its name. From its mere geographical position, on the very threshold of Scotland, it was only natural that Newcastle should know the perpetual clash of arms.

J. S. Fletcher.—*The Enchanting North.* Eveleigh Nash, 1908.

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V.—YORKSHIRE AND THE BASIN OF THE OUSE

Yorkshire

THE county of York, which contains within its bounds so much of varied and characteristic English beauty, falls into certain natural and well-defined divisions. Through the midst of it from north to south runs that great fruitful and historic plain known as the Vale of York, of which the northern portion is sometimes described as Mowbray Vale, because of the great lords who once dwelt thereby. Westward, from beneath the new red sandstone and gravel of the vale, rises the glorious region of the mountain limestone, in which are excavated the romantic dales of the Swale, the Ure, and the Nidd; and southward of this again are the sandstone hills, capped with great moorlands, that range with the elevated tracts of Northern Derbyshire.

From the eastern outliers of the limestone hills we look far across the vale of Mowbray to the north-eastern hills, which lie between its fruitful strath and the sea. Here, again, we have a district well defined lying between the gentle slope which flanks the estuary of the Tees on the north and the shallow saucer-like vale of Pickering on the south, in which the waters of the Rye and Derwent are joined before flowing southward to the Ouse. The vale of Pickering separates these north-eastern hills from another very distinct region, the rounded chalk hills of the Wolds, which look westward across the great plain of York, and reach the sea in the huge water-worn cliffs of

Flamborough; and southward of these, again, lies the diluvial district of Holderness, a tract of fragments drifted from far-distant regions, as well as of later lacustrine and peaty deposits.

Except in the long, low shore of Holderness, the Yorkshire coast confronts the Northern Sea and the pitiless blasts of the north-east wind, with grim escarpments of seamed and shattered rock, from which the rude violence of the tempest has hurled down here and there the rugged undercliff that lies below. It throws out huge headlands that half encircle with their protecting arms its lovely "wykes" and bays, and it thrusts far out to sea the hoary scarps of Flamborough, that seem, like some ancient weather-beaten foeman, to bid stern defiance to the storm.

JOHN LEYLAND.—*The Yorkshire Coast and the Cleveland Hills and Dales,* 1892.

By permission of Messrs. Seeley.

The Yorkshire Castles

No county in England was so encrusted with castles, fortresses, and fortified houses as Yorkshire was in the old days, and there are none now so rich in ruins and remains. How many castles there were in mediæval days not even the most learned can say with accuracy. Of some strongholds that were known to exist there is now no trace whatever; of others the fragments are so few and insignificant that it is impossible to say anything definite of the original structure. In some cases, as at Richmond and Middleham, there is so much of the castle left as to give one a very tolerable notion of its grandeur; in others, as at Topcliffe and Malton, one must trust to pure conjecture as to where and what the castle was. But in wandering about the county no one can fail to be struck by the number of ruins, or by the situation in which most of them are found. In most cases the castle occupies the most prominent place in a district or landscape, especially when

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RIEVAULX ABBEY.

it was the chief stronghold of a great family. Conisborough, which had almost certainly been a Saxon fortress before it became a Norman castle, commanded the valley of the Don; Pontefract, frowning from a rocky promontory over a wide stretch of Airedale, might well be called the key of Yorkshire; Richmond, similarly perched above Swaledale, was practically impregnable; Scarborough can only be approached by a narrow strip of land; Knaresborough and Pickering dominate their surroundings; and even fortresses like Middleham and Sheriff Hutton, set in the midst of a pastoral country, were so situated as to impress the eye while they commanded the land and the people. Relatively, of course, the castles were not of the same consequence. Pontefract, from its vast size, its commanding situation, and the importance of the burgh in the Middle Ages, would attain an importance which such baronial strongholds as Crayke or Gilling could not acquire; Skipton, because of its command of the western border, became at times the scene of lively operations, which were rarely known at the smaller castles. Much of the history of the county centres round the castles of York, Pontefract, Middleham, Bolton, Skipton, Scarborough, and Richmond, and of these and of other strongholds scarcely less important there are fortunately remaining sufficient quantities of the original structures to enable the student to form an accurate estimate of their size and appearance in their best days.

A good deal of the architecture of the Yorkshire castles is Norman, not a surprising circumstance when one bears in mind the fact that the first care of the dominant party after the Conquest was to build castles in the most advantageous positions. Perhaps the best examples of pure Norman work in the county, so far as military architecture is concerned, are found at Richmond, Scarborough, and Conisborough; but there are other interesting examples at Pontefract and at Spofforth. The great majority of the castles, however, are of architecture of the Edwardian eriod. Bolton Castle is one of the best examples in this ountry of a complete fourteenth-century stronghold, and s further remarkable as being able to convey a sense of he perpetual menace which a mediæval fortress must have een to the surrounding country.

J. S. Fletcher.—*A Book about Yorkshire.* Methuen and Co., 1908.

By permission of Messrs. Methuen.

Yorkshire Dales and Fells

It is because the hills are so big that the valleys are eep, and it is owing to the great watersheds that these ong and narrow dales are beautified by some of the most opious and picturesque rivers in England. In spite of his, however, when one climbs any of the fells over 2000 feet, and looks over the mountainous ridges on every ide, one sees, as a rule, no peak or isolated height of any escription to attract one's attention. Instead of the ounded or angular projections from the horizon that are sually associated with a mountainous district, there re great expanses of brown tableland that form themselves nto long parallel lines in the distance, and give a sense of ild desolation in some ways more striking than the peaks f Scotland or Wales. The thick formations of Millstone rit and Limestone that rest upon the shale have generally voided crumpling or distortion, and thus give the mountain views the appearance of having had all the upper urfaces rolled flat when they were in a plastic condition. enudation and the action of ice in the Glacial epochs have orn through the hard upper stratum and formed the ong and narrow dales; and in Littondale, Wharfedale, Wensleydale, and many other parts, one may plainly see he perpendicular wall of rock sharply defining the upper dges of the valleys. The softer rocks below generally ake a gentle slope from the base of the hard gritstone to he riverside pastures below. At the edges of the dales, where waterfalls pour over the wall of limestone—as at Hardraw Scar, near Hawes—the action of water is plainly demonstrated, for one can see the rapidity with which the shale crumbles, leaving the harder rocks overhanging above.

Unlike the moors of the north-eastern part of Yorkshire, the fells are not prolific in heather. It is possible to pass through Wensleydale—or, indeed, most of the dales—without seeing any heather at all. On the broad plateaux between the dales there are stretches of moor partially covered with ling; but in most instances the fells and moors are grown over at their higher levels with bent and coarse grass, generally of a brown-ochrish colour, broken here and there by an outcrop of limestone that shows grey against the swarthy vegetation.

In the upper portions of the dales, even in the narrow riverside pastures, the fences are of stone turned a very dark colour by exposure, and everywhere on the slopes of the hills a network of these enclosures can be seen traversing even the most precipitous ascents. Where the dales widen out towards the fat plains of the vale of York, quickset hedges intermingle with the gaunt stone, and as one gets farther eastwards the green hedge becomes triumphant.

The roofs of churches, cottages, barns, and mansions are always of the local stone that weathers to beautiful shades of green and grey, and prevents the works of man from jarring with the great sweeping hillsides. Then, instead of the familiar grey-brown haystack, one sees in almost every meadow a neatly-built stone house with an upper story. The lower part is generally used as a shelter for cattle, while above is stored hay or straw. By this system a huge amount of unnecessary carting is avoided, and where roads are few, and generally of exceeding steepness, a saving of this nature is a benefit easily understood.

The ways of approaching the Dale Country from the south are by means of the Great Northern, Midland, or

reat Central routes to York, where one has all the north-
stern service to choose from. Ribblesdale is traversed
the Midland main line, so that those who wish to
mmence an exploration of these parts of Yorkshire from
ttle, Skipton, or Hawes, must travel from St. Pancras
ation.

Gordon Home.—*Yorkshire Dales and Fells* (illustrated). A. and C. Black, 1906.

By permission of Messrs. A. and C. Black.

The Wealth of Yorkshire

Perhaps the most characteristic of the Yorkshire industries
that which gives employment to the great bulk of the
owded populations of the West Riding, and may be classed
der one comprehensive term—the making of clothes. All
e great towns of the West Riding are engaged in the
inning and manufacturing of silk, linen, cotton, and wool.
oollen goods and worsted goods are the chief objects
manufacture, and have their own particular homes and
ntres. When a Yorkshireman speaks of "Leeds goods,"
means all kinds of goods of the woollen industry; when
speaks of Bradford, he means worsted goods. All the
her towns and districts have some speciality.

Some of the manufactories—"mills," as they are called
the textile-producing district—are of vast size: the silk
d velvet mill at Manningham, near Bradford, covers an
ea of 11 acres, and cost £500,000 to build; at the
eat Saltaire Mill, where Sir Titus Salt began the manu-
cture of alpaca, between 2000 and 3000 workpeople are
ployed; at Crossley's famous carpet mills in Halifax
rk is found for nearly 5000 people. All over this
strict, from Bradford on the north to Huddersfield on
e south, from Wakefield on the east to Todmorden on
e west, the mills are everywhere—vast many-windowed
ections which fill up every valley. In the twilight of
tumn and winter, or in the early winter mornings, their

lights are seen across the hills for mile upon mile, producing an effect which—save in Lancashire—cannot be seen elsewhere in England.

People who travel into Yorkshire for the first time are apt to take their impressions of the country from what they first see. To enter it by way of Huddersfield, from Manchester, one would take it to be a land of great factories; by way of Sheffield, from Derbyshire, a land of furnaces and awful gloom; by way of Skipton, from the Lancashire border, a pastoral country with signs of a romantic past. If a man could be set down at, say, Barnsley, and told to make his way northward by way of Normanton to Leeds, he might well be forgiven if he came to the conclusion that Yorkshire is a land of coal-mines. In this district they are everywhere in evidence, and the collier is the dominant factor, with his powerful union, his direct representatives in Parliament, and his own world of life and amusements. Out of the Yorkshire coal-field there is now produced about 30,000,000 tons of coal per annum. Amongst its Coal Measures are found large quantities of ironstone, which is worked in the West Riding at Low Moor and at Bowling, both near Bradford. But the greatest wealth of the county, so far as iron is concerned, lies in the Cleveland district, which has already, within fifty-four years, produced vast quantities, and seems to be inexhaustible. There are other minerals of great value in the county: the hillsides which overlook the Swale, beyond Richmond, are pitted with lead-mines, and there are more along the valley of the Nidd; stone of the most excellent quality is found in great bulk near Bradford, Tadcaster, Ackworth, and Elland; marble may be quarried in some of the northern dales; and jet and alum are found in considerable quantity amongst the headlands and in the neighbourhood of Whitby.

. . . Yorkshiremen are proud of Sheffield as being the centre of the steel trade, the world's workshop for knives, scissors, razors, surgical instruments, armour-plates, rails, saws, files, castings, and heavy forgings. Within the smoke-canopied boundaries of the town are some of the largest steel and iron works in the world. In their sheds wonderful things are done with steel: one may watch steel wire drawn out to the consistency of the finest human hair, or vast masses of metal dealt with as if they were so much dough. Little wonder that out of the midst of such a wonderful hive of modern industry all traces of the historic past have almost vanished, or that the Sheffield man should forget that in the centre of his crowded, bustling town Mary Queen of Scots spent fourteen years in captivity.

It is somewhat strange that a county possessing such a lengthy seaboard as Yorkshire should have so few seaports, and only one of the first importance. As a matter of fact, there are only three seaports actually on the coast; for Hull is several miles along the Humber from Spurn Point, and Middlesbrough is about as far from the mouth of the Tees, while Goole and Selby are, properly speaking, inland riverside ports. Of the three coast ports—Whitby, Scarborough, and Bridlington—there is little that can be said of their commercial importance. Whitby has some foreign trade, and ships, coal, and ironstone; but it has decreased in importance and wealth since the days when it built ships (it provided Captain Cook with the vessels wherewith he journeyed round the world), and sent out a fleet to the whaling-grounds.

Scarborough has also some foreign trade, and so has Bridlington, but the greater number of craft which come into their harbours are connected with the fishing industry. Goole has an extensive water trade with Hull, and also sends steamships to Rotterdam, Antwerp, some of the northern French ports, and to the Channel Islands; but her docks can only accommodate comparatively small vessels. Middlesbrough, where extensive docks were built after the rapid development of the iron trade, does a large trade in exporting its own products. But when one talks of a seaport in Yorkshire, one's thoughts naturally turn to Hull, which, since the time of Edward I., has steadily risen in importance, and now does a vast export and import trade with all parts of the world, but especially with the North European ports. Naturally, modern Hull has lost much of the romantic air which distinguished her in the days when the High Street merchants used to send out ships to the Greenland and Arctic whaling-grounds. That branch of seacraft began at Hull in the sixteenth century, and flourished there until 1857, when the last of the whalers, the ancient *Diana*, was wrecked on the Lincolnshire coast. Nowadays the trade of Hull is entirely practical, prosaic, and twentieth-century. An inspection of the docks, many of them of vast size and capable of accommodating the largest vessels, helps one to form some notion of the great carrying trade done by Hull ships.

J. S. FLETCHER.—*A Book about Yorkshire.* Methuen and Co., 1908.

By permission of Messrs. Methuen.

Holderness

There was a time when Hull was jealous of the trade of Ravenspur (which is sunk beneath the sea), and feared the merchants who did business where the waves break white upon the shingle now—so curious have been the turns of fortune on this unstable coast. For the scour of the currents running south along the whole low coast from Flamborough to the mud-banks of the Humber is for ever washing stealthily away now one, now another bank; and were it not that on Spurn Head itself—which has no rock or even chalk wherewith to fend itself against the tide—the action of these currents is counteracted by other forces from within the estuary, the headland would long since have vanished, and Hull itself might have been a mere lost memory, like Ravenspur, or Auburn, farther north, or many another town or village where the children's playgrounds are now open to the gambolling of crabs and starfish.

Now the land of Holderness—of which Beverley is the glory, and Hull, I had almost said, the blot! but let me say rather the greatest proof of modern energy—is a pleasant one to travel through in early summer, when the woods are in fresh leaf, and the corn is springing, and the wind blows softly from the sea across the level flats. . . . Sometimes I come out on the low sea-coast, where a little range of bluffs, scarcely to be spoken of as cliffs, mark the windings of the shore—a lonely, solitary beach, given over argely to the gulls, who sit all day upon the shining sand n the first wash of the waves.

Far away to northwards I see Flamborough lying like a cloud, and Hornsea, a little place growing out of all know-edge now, but which for many a century, until Hull people took the fancy of seeking sea-breezes there, was as lonely a little town as anyone might desire to dwell in. In old days men did not unfrequently desire to dwell in lonely towns upon the shore, where they might practise in seclusion those ways of growing rich which the sea, great demoralizer of the human race, as it has been in all ages, cast freely in their way.

. . . As I draw near Bridlington I have little else to think of than the aspect of this hill country, which juts out so boldly into the sea at the great headland of Flamborough. . . . It is worth noting that this large district of the wolds was not enclosed until some sixty years ago. t formed till then no more than one large sheep-walk, and ts scanty population were shepherds, formed into a society among themselves. There are fewer shepherds now among he chalk hills; there is greater wealth there, too, and the ife has grown less simple. Yet the district still retains many ancient customs and ways of speech which are long orgotten in the more thickly peopled country.

These wolds are rather curiously subject to great cloudbursts, whence come floods that, sweeping down the deep ollows of the hills, have from time to time done much damage. Such a flood occurred at Langtoft, some 7 or 8 miles inland, in 1892, and, as an illustration of the perils which hover at long intervals over these hill districts, the circumstances are worth noting, especially since the catastrophe was by no means unexampled. It was a Sunday afternoon, the 3rd of July, and the morning had been hot and cloudless. As the day passed the sun went in, the breeze dropped, the air grew perfectly still and oppressive, and a heavy copper-coloured cloud brooded over the surrounding country. Gradually this blight upon the heavens was seen to be gathering itself together into darker clouds or spots of very striking weight and blackness, and about the time of evening church these clouds began to travel rapidly across the sky in the direction of Langtoft, drooping more and more towards the earth, till, as they reached the hill above the village, there was a terrible crash of thunder, the sudden lightning streamed over all the sky, the cloud tapered downwards in several twirling columns, the peals broke, and the whole volume of water descended with furious violence on the hillside.

At the point where it struck the ground a series of deep rents were torn through grass and chalk, which resemble nothing so much as the devastation of an earthquake. From top to bottom of the hill, a full 100 yards, these great fissures lie, attesting the mighty power of the water which went whirling down the valley 6 feet deep, sweeping away haystacks and cattle, sapping walls and houses, and putting the lives of many village people in the gravest peril. At the same moment there fell a shower of hail, and out of the black sky the thunder rolled continuously. It was an awful day, and none who passed through it can speak of their remembrances without some trace of terror, or recall the seething flood which rushed into their houses without a shudder.

A. H. NORWAY.—*Highways and Byways in Yorkshire.* "Ingleborough Cave," p. 348.

By permission of Messrs Macmillan.

Hull and the Humber

Whatever the Yorkshire coast has possessed of commercial activity, in its dealings with countries beyond the sea, has fallen in these later times to the busy port of Hull. The Flemings, Easterlings, and Danes, who were wont to resort to the eastern mart of Scarborough; the Netherland and Florentine merchants who came to buy the wool which the Yorkshire Cistercians and sheep-farmers produced; the Argosies, with their fine fabrics, that from Ypres, Ghent, Bruges, and Antwerp, resorted to the quays of Ravenser, Hedon, and Beverley; the active trafficking that the men of Whitby carried on later with the ports of the Baltic—all these are represented in these days by the ships and men that have recourse to the great port in the Humber. The reasons for this change of direction in the commercial stream are manifold, but the chiefest of them are natural. The sea, with its ravages upon the coast of Holderness, did its most impressive work of material destruction within the point of the Spurn, where the important port and town of Ravenser, or Ravenspur—the Ravensburg of Shakespeare—has altogether disappeared, with its island of Ravenserod. . . . But if the sea has worked thus destructively within the estuary of the Humber, it has operated otherwise with the river itself in a very marked manner thereabout. The network of rivers that water Yorkshire and a part of the Midlands discharged themselves, in the early Middle Ages, through a vast morass of mud and marsh into the Humber. Of that fenny tract a great part has been reclaimed for agriculture by the labour of Cornelius Vermuyden, the Dutchman, and many others; and by the ingenious process of "warping," the waters are now made to drop their fertilizing ooze upon the soil. But a vast amount of alluvial soil is carried out into the Humber estuary, where, but for the steam dredges, the docks at Hull would soon be filled; and it was here, out of this "warp" and the soil washed away from Ravenser, that by the action of river and tide a vast deposit was gradually formed, between Patrington and the river, which rose gradually, until it was at length reclaimed in the time of the Stuarts, was formed into a parish in 1831, and is now the fruitful cultivated tract known as Sunk Island. The process which thus went on affected also the waterway of the Hull, which, with the increased draught of vessels, at length became impracticable for merchant craft, and thus Beverley was cut off from direct communication with the sea. The same thing happened also at Hedon — a thriving borough chartered by Edward III., which returned representatives to Parliament even until the time of the Reform Bill—now outrivalled by Hull, and with its water silted up, remaining a quiet decayed little place some 2 miles away from the Humber. You may see evidence of its former greatness in its splendid church, which is known as the "King of Holderness," just as the sister church of Patrington is spoken of as the "Queen."

And we may trace the rise of Hull, too, to the unrivalled advantage of its situation in regard to the inland country; for while in the Middle Ages the marshy waterway of the Esk was scarcely available for the conveyance of moorland wool to Whitby, and long journeys by pack-horse or wain awaited those who would carry their produce to Scarborough or other places on the coast, the rivers that converge to the Humber—the Ouse, the Aire, the Don, and the Trent—with their network of tributaries, made it possible to float down the produce of a vast and fertile country to Hull. Be it remembered that from the twelfth century till the time of Edward III., or later, our export trade was chiefly in wool, as a raw material for manufacture, to the great Flemish port of Bruges; and when that had decayed, through the action of Maximilian, to Antwerp, and that it was not until later that we began to export fine fabrics ourselves.

JOHN LEYLAND.—*The Yorkshire Coast*, etc.
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VI.—THE LANCASHIRE COAST

Blown Sand

SAND-HILLS are forming so extensively along the Lancashire coast that a few words need to be written respecting them. The set of sea currents is such along the coast from north of Liverpool to Fleetwood that almost continuous sandy beaches are formed. Indeed, these have accumulated in some cases to such an extent that the sea appears to be retiring from the land. This is well seen at Southport, where marine lakes and promenades take the place of what was once open beach swept by every tide. The exposure of the sand-banks at low tide to the sun results in the upper layer of sand becoming dried, when it is easily moved by the wind and swept inland, where it collects against any obstacle such as fences or buildings, and accumulates until it at length overtops them, and falls over upon the other side. In this way a low eminence is formed, which is continually being added to on the seaward side, and is continually being reduced by the surface being carried farther inland. In this way an extensive belt of arable land has been covered over, and the encroachment has become so serious that vigorous attempts are made to stop its farther progress by planting "starr-grass," whose long matted roots hold the sand together, while the leaves protect the surface.

Southport is entirely built upon blown sand, which can also be seen inland behind it.

At Formby the sand-hills are 3 miles in width, although it is stated that none existed so lately as 1690, the whole deposit having been formed since by the silting up of the then Formby Harbour, and the formation of a sand-bank against the land, from which the loose sand was carried landwards. Between Formby and Birkdale, near Southport, many farms have been entirely covered up within the last hundred years, and farms completely buried.

The sand often contains shells and shell fragments, which have been also wind-borne, and these decaying, the carbonate of lime of which they consisted becomes dissolved in the acid-laden rain, and being afterwards reprecipitated, it serves as a cementing material to the sand, which thus becomes solidified, and even impermeable to water.

Between Fleetwood and Rossall the sand is extremely large-grained.

H. Bolton, F.R.S.E.—"Lancashire," *Victoria County Histories*, vol. i.

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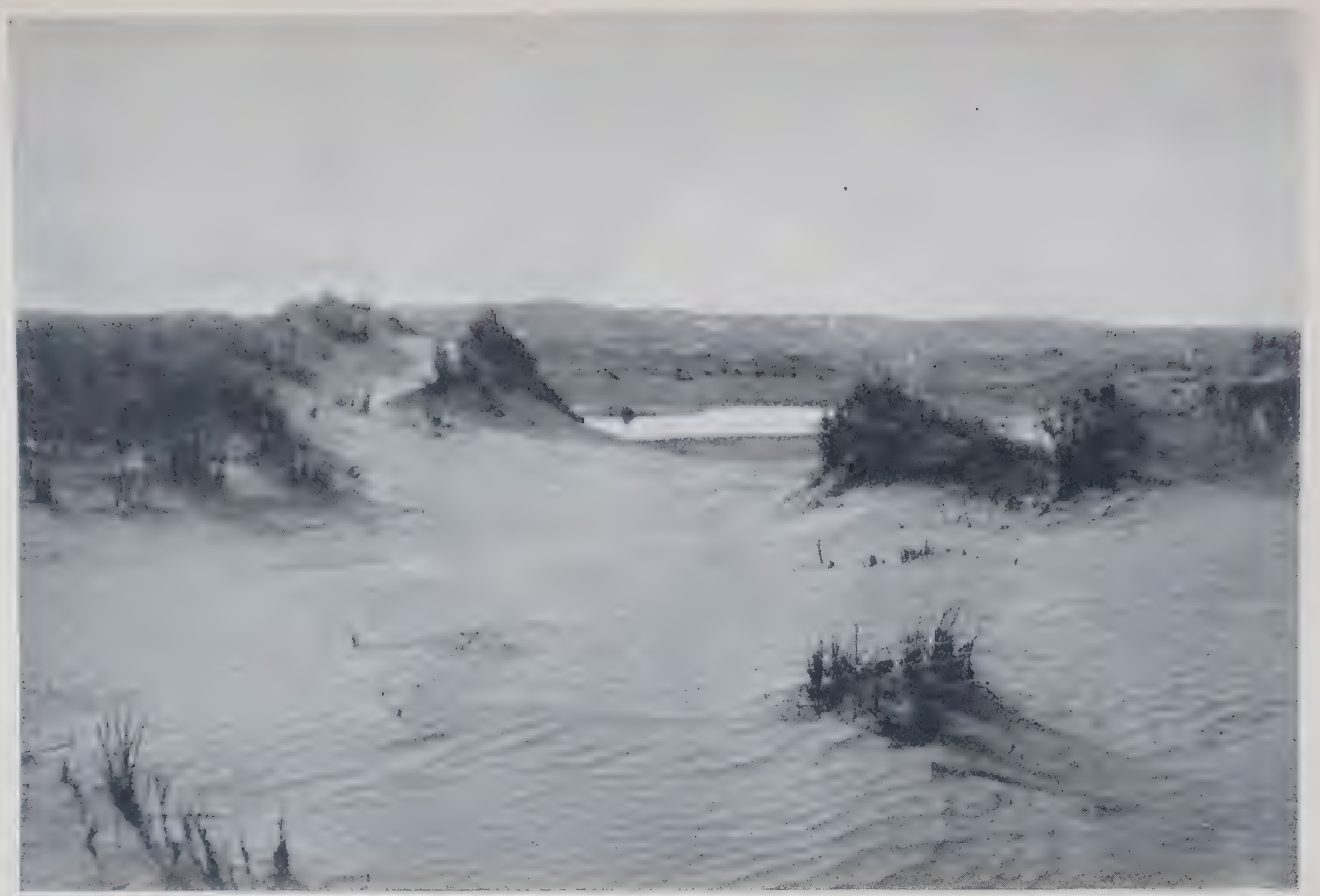
The Manchester Ship Canal

Manchester, the great industrial centre of Lancashire, is removed by a distance of 30 miles from the sea, a geographical fact which the difficulty and cost of transport over the intervening land has long impressed on the mind of its citizens.

Frequent and strenuous have been the efforts to provide easier communication by artificial means. In 1776 the Duke of Bridgewater's celebrated canal was opened, and it was between Manchester and Liverpool that in 1829 the earliest steam railway was constructed. By the construction of the Bridgewater Canal the cost of carriage to the sea had been diminished by one-half, and so, with the intention of effecting a similar reduction, a new canal was projected.

A natural waterway between Manchester and the sea



Mrs. H. Snowden Ward.

SAND DUNES AND RIDGES FORMED BY WIND.

has always existed, the Irwell, which flows through the city, being one of the main tributaries of the Mersey, at the mouth of whose estuary lies Liverpool.

Within the last few years, however, a great change has been effected. The foul and shallow stream has been replaced by a splendid waterway stretching to the sea, wider and no less deep than the Suez Canal, and the largest ocean vessels can sail up to and discharge their cargoes on the quays of Manchester, now a duly constituted port of the United Kingdom.

Brindley, the famous engineer of the Bridgewater Canal, when asked what he considered the object of rivers, is reported to have replied: "To feed canals, of course." The engineer of the new waterway between Manchester and the sea has expanded this idea by converting a river bodily into a canal. The Manchester Ship Canal is essentially the lower portions of the rivers Irwell and Mersey straightened, deepened, widened, and controlled; in fact, the river system has become so modified that, instead of the Irwell being a tributary to the Mersey, these two streams might now almost more aptly be described as the principal feeders of the Ship Canal. One obvious reason for adopting, as far as possible, the actual course of the existing streams lay in the great difficulty and cost of obtaining any other route through so densely populated a district as that which had to be traversed.

The Mersey at its mouth widens into a large estuary 27 square miles in extent, communicating with the sea by a narrow channel some half-mile wide, on the edge of which stands Liverpool. At each turn of the tide a large volume of water, owing to the great size of the estuary, rushes through this channel, and thus scours it by natural means. According to the original scheme, the canal was to have been brought down the middle of the estuary from Runcorn by means of training walls and a dredged channel, but it was objected that this would lead to a silting up of the sides of the estuary, and consequent alteration of those natural conditions which assist in keeping the channel at Liverpool clear. With no little ingenuity the promoters of the canal overcame this objection by altering their original plan so as to bring the canal along the edge, and not down the middle. This will explain the apparently unnecessary détour round the Cheshire shore from Runcorn to Eastham. All opposition from the Bridgewater Navigation Company was subsequently removed by the purchase of the latter's undertaking; but in the meantime the Ship Canal Company's Bill passed both Houses of Parliament, and received the royal assent in August, 1885.

Five and a half years had been spent in obtaining the means and power to construct the canal; six more were destined to elapse in its execution. On November 25, 1893, the canal was filled from end to end; and on January 1, 1894, it was finally opened for through traffic to Manchester. The original purchase of land (4520 acres) cost rather more than a million pounds. Of this land, however, there is a surplus available of 2500 acres, which no doubt will have an increasing value, as they lie along the banks of the canal.

The total length of the canal measures 35½ miles, and falls naturally into two main divisions: a lower reach of 21 miles, which is to a certain extent tidal from the entrance at Eastham to the locks at Latchford; and an upper portion of 14½ miles, subdivided by three locks into four smaller sections.

Three immense tidal openings, each 200 yards long, at Ellesmere Port, Weaver Mouth, and Runcorn, admit the water to the canal whenever it rises outside to a height above the ordinary water-level within, thus equalizing the levels and preventing the somewhat slender barrier which in part separates this portion from the estuary from being crushed in by the pressure of a high tide.

Owing to this arrangement, there should be no lack of water in the lower section of the canal, as at every mean high tide the sea will more than supply any deficiency.

Accordingly, streams entering this section are treated in a different fashion from those which flow into the portion above Latchford. There, where a scarcity of water may be felt, all streams, from the Mersey down to the smallest brook, are suffered to discharge their waters into the canal; but in the lower section they are either—when small, like the Gowy—siphoned through iron tubes under the bed of the canal into the estuary beyond, or when large, like the Weaver, provided with a long series of sluices for the discharge of surplus water through the bank opposite the point of entry.

In width the canal varies slightly at the surface level, but its navigability is best indicated by the minimum width at bottom, which is 120 feet.

One of the chief difficulties which beset the construction of the canal lay in the number of established routes crossing its line, since a waterway for masted ships requires a clear headway of considerable height. Ordinary roads could be managed by means of swing-bridges, and no less than seven have thus been dealt with; but the railways, of which five cross the canal, required fixed bridges. To deal with the line which crosses the Mersey on a high viaduct below Runcorn was found to be impracticable, so this, which unfortunately is only 75 feet above the ordinary water-level of the canal, decided the height of the rest. There are six high-level bridges 75 feet above water-level, in addition to the old Runcorn Viaduct, crossing the canal.

Two other obstacles presented difficulties of a more novel character. The one was the Vyrnwy Aqueduct, bringing Liverpool's new water-supply from the Welsh hills; the other the old Bridgewater Canal. The former has been treated like the river Gowy, and taken through a tunnel under the bed of the canal; the latter, however, was less easy to deal with, and in its treatment represents one of the most brilliant engineering feats of the whole undertaking. To carry the old across the new canal a swing-bridge has been built, which is pivoted on an island in the centre of the latter. When a ship has to pass, watertight gates are closed at each end of the bridge, and a complete section of the canal swings round and back again without a drop of water being lost.

Some idea of the magnitude of the work done in constructing this remarkable canal may be gained from the fact that 51,000,000 cubic yards of soil and rock were excavated in the task, more than 16,000 men and boys and 100 steam-excavators being employed, and 10,000 tons of coal per month consumed when the work was in full swing.

All the work done is of an extraordinarily massive and substantial character; the dock space at the terminus is immense, over 100 acres in extent, with 5½ miles of quays, which are a model of good workmanship and wise provision for possible requirements in the future. The largest lock can be cleared in eight minutes, and the bridges swing open on the approach of a vessel, causing no delay, so that Manchester can easily be reached in six hours from Liverpool.

Manchester is now a port of the United Kingdom; is it destined to become a leading one? In point of population there is no reason why it should not. Within a radius of 12 miles round Manchester there is a population twice as great as that in a similar area round Liverpool, and it has been calculated that in the districts which are nearer to the Ship Canal than to any other ocean steamship port there is a population of no less than 7½ millions.

There are, however, two drawbacks likely to militate against the success of the new venture at the outset, if not longer. One is the lowness of the bridges. The other is with regard to the water itself. The Mersey and its tributaries are not steady streams. Coming from the rainy side of the hills, with a comparatively short course to the sea, they are apt in winter to sweep down in furious floods, carrying quantities of silt. But perhaps their summer mood will be even more difficult to deal with. Anyone who has seen the Irwell or Mersey in a dry season, creeping along a black shadow of itself, cannot help wondering where the water will be found to float the hoped-for fleets. A great undertaking, however, is almost complete for supplying Manchester with water from Thirlmere, in the Lake District. In times of need some of this enormous supply might be used, and the curious spectacle seen of ships floated from Manchester to the sea with water partly brought from Cumberland.

H. YULE OLDHAM.—"The Manchester Ship Canal," *Geographical Journal*, June, 1894.

By permission of the Author.

The Influence of a Great Canal: The Port of Manchester

The facility with which trade moves to a new port varies with a number of considerations. The momentum which older ports have acquired, the organization of the traders in the commodities imported and exported, and the weight and bulk—as well as the value—of these commodities, have all to be taken into account. To illustrate these factors in the development of a port, and at the same time to obtain some idea of the hinterland of the port of Manchester, we propose to examine the conditions determining the distribution of some of the chief commodities introduced into the country by the Ship Canal.

To Manchester people cotton is naturally the most interesting of these, and it illustrates very well some of the difficulties which prevent the rapid development of the port. At first sight it might appear that it would be through Manchester that the great bulk of the raw material required in the cotton industry would be introduced into the country. With nearly 75 per cent. of the spindles of the United Kingdom in its immediate neighbourhood, Manchester only imports about 14 per cent. of the raw material which is used, while Liverpool imports about five times as much.

For this there are several reasons, the first being of an economic nature. In the first place, there is the long-established supremacy of Liverpool as a cotton market. That city thereby acquired a momentum which could not be seriously affected within the short period which has elapsed since the opening of the canal. At the beginning of that period, too, there was no cotton market in Manchester. The Manchester spinners had either to buy direct from the United States, or go to Liverpool and buy in the market there.

As compared with 121,336 bales of American cotton imported to Manchester during the season 1895-6, the quantity imported from America during the season 1907-8 amounted to 377,264 bales. The establishment of a spot market in Manchester will lead to an increase of buying in that town, and will encourage the American shipper to send his cotton there in the future to a greater extent than in the past.

Relatively, a much larger amount of Egyptian cotton goes to Manchester. At the present time one-half of the Egyptian cotton used in Lancashire mills is shipped to Manchester. During the season 1907-8 this amounted to 216,570 bales.

Timber is another of the chief articles of import to Manchester—by weight it is the most important. The Pennine Chain forms practically the dividing-line between the hinterland of Manchester and Hull for this commodity. To the east of the Pennines the greater part of the timber required in building, in the manufacture of packing-cases of all kinds, and for general purposes, consists of pine and fir wood, which comes from Scandinavia and Russia; to the west of these, mountain spruces and other woods from North America perform the same function, although some comes from the Baltic. The chief market for the buying and selling of timber is in Liverpool, but as it is one of those articles of which whole shiploads can be sent, the Liverpool importer frequently sends ships on to Manchester to unload.

This wood is chiefly used in East Lancashire, where there is naturally a great demand. Some of it, however, does make its way as far east as Leeds and Bradford, while the market for it extends south as far as Nottingham, where the southern ports begin to compete with Manchester, which is now the eighth timber port in the United Kingdom.

Finer and harder woods, however, very seldom come to Manchester direct. These are not imported by the shipload, but in smaller quantities. The ships which bring them—say from South America—are generally Liverpool-bound ships, and the value of the wood is such that it can easily stand the slight additional charge of carriage from that port.

During those years for which we have official figures we find that the tonnage of raw materials used in the manufacture of paper ranks third in the list of imports by way of Manchester, and no inconsiderable part of the whole of our imports of wood-pulp comes up the Ship Canal. In England paper-mills are found chiefly in Lancashire, in the West Riding of Yorkshire, and within a radius of 30 to 40 miles of London, the first and the last being the districts in which the number of mills is greatest.

Fruit imports of Manchester are considerable, and, as the area over which they are distributed varies from the area of distribution of other imports, a few words on the subject may not be out of place. The West Mediterranean, the West Indies, Canada, and the United States, are the chief sources of supply. Before the opening of the canal, and still to a large extent, the fruit-importing business was centred in Liverpool. Manchester fruit merchants saw that if they were to reap the advantages created by the new port they would have to become their own importers, and the North of England Fruit Brokers Company, Ltd., was formed. That company has established regular sailings with the West Mediterranean, and the fruit which is imported finds its way northward as far as Blackburn, into the western towns of the West Riding of Yorkshire—

e.g., to Sheffield—and southward as far as Leicester, Nottingham, and Birmingham.

The banana trade with the West Indies and Costa Rica was established after the opening of the canal, and Manchester was fixed upon as the port of entry, because of its nearness to the source of supply on the one hand, and to a large consuming area on the other. The whole of the bananas shipped from the West Indies and Costa Rica are landed at Manchester and Bristol, the former receiving about two-thirds of the whole, or 60,000 bunches per week. The business is in the hands of one firm, and the country is practically divided into two parts. Bristol serves the South of England, Birmingham, and London in part; Manchester serves the rest of the kingdom, a great part of the Birmingham area, and London in part. From Manchester also bananas are sent, packed in special vans, to Ireland, to Hamburg, and to the Baltic countries. In this case, therefore, we have an industry able, because it is in the hands of one firm and free from complications, to avail itself of the geographical advantages of the new port.

JOHN M'FARLANE, ESQ. — From an article (abridged) in the *Geographical Journal*, November, 1908.

By permission of the Royal Geographical Society.

Growth and Position of Liverpool

It is only necessary to glance at the map to see why Liverpool has become the greatest of English ports. The city lies, as nearly as may be, at the exact centre of the British Isles. Seated on the slopes of a low ridge, she looks down upon a great estuary, which is sheltered from all winds but the north-west, and (thanks to its narrow mouth) is scoured out twice a day by the rush of racing tides. This estuary opens upon the central reach of the only purely British sea, which laves the shores equally of England, Scotland, Ireland, and Wales, and leads round the North and South of Ireland into the open waters of the

Atlantic, the highroad to all the world. To the south and east the estuary extends towards the centre of England. On the one hand lie the clustered and populous towns of Lancashire, with its mines and factories, the busiest tract of land in all the world; on the other hand the plain of Cheshire stretches between the mountains of Derbyshire and those of Wales, forming the one great gateway (with the exception of the lower Severn valley) in the long chain of mountain land which cuts off the west coast of England from the main mass of the country. Through the Cheshire gap, as geographers call it, the Romans drove their roads to the west and north, and to-day roads, railways, and canals converge upon it and make it the channel of communication between Midland and Southern England and the great central port of the British Isles.

Liverpool would have been a great city if she had been nothing but the port of Lancashire; but she is far more than that. She is the meeting-place of the Four Kingdoms, with more Welsh citizens than any Welsh town but Cardiff, more Irish citizens than any Irish town but Dublin and Belfast, more Scottish citizens than any but some three or four of the great towns of Scotland. The height of her greatness only came, indeed, when she reached beyond those nearer seas, captured the trade of Africa and America, and became the gateway, not of England only, but of Europe to the west.

It may, perhaps, seem difficult to understand why, with such advantages of position, Liverpool was so long in establishing her supremacy; but it was only very slowly that these sources of her wealth began to be opened up. Until the seventeenth century all the main connections of England, both in trade and civilization, were with the opposite coasts of Europe. All her own wealth was concentrated in the low and flat lands of the south and east; the north lay desolate, savage, and very thinly peopled. It was not till the eighteenth century that the mineral wealth of Lancashire began to be developed, or the cotton industry to be fostered by the fortunate moistness of her climate; and, apart from mines and climate, Lancashire is a poor county. Until the middle of the eighteenth century Lancashire was one of the least important counties of England, and she was isolated from the rest by the mountains on the east and by a range of marshes on the south.

Even from inland Lancashire Liverpool was long cut off by the marshes which lay between Prescot and Ormskirk on the north-east, and by Chat Moss on the south-east. She was hemmed into the most isolated corner of an isolated county. Moreover, her estuary, though it led inland, did not lead to navigable rivers. The streams that run into the Mersey estuary—the Mersey itself, the Irwell, the Weaver—run short courses from the neighbouring hills, and cannot compare with the rivers from the east, which trace long and sinuous courses through level lands, and are in many cases navigable for boats for many miles from the sea. And, finally, so long as the channel of the Dee estuary remained open and unsilted, Liverpool was faced by a serious rival for the trade even of Ireland in Chester, which was also admirably placed for commanding the northern roads into Wales, and, being an ancient city of the first military importance, had on its side all the advantages of prestige.

Thus the great natural advantages of her position were largely nullified for Liverpool during many centuries by a combination of adverse circumstances: a poor and thinly-peopled surrounding country, isolation, great physical obstacles to inland communication, a lack of natural waterways, a successful rival long established and close at hand. All these obstacles had to be overcome, either by the energy of her townsmen, or by the development of events, before the town rose to a place among the great trading centres of the world.

The story of the gradual disappearance of these obstacles forms the main thread of the history of Liverpool.

At the end of two centuries from the creation of the first humble dock, the port possesses dock space to the extent of 570 acres on both sides of the river. The massive granite walls by which these docks are surrounded give a lineal quayage of over 35 miles, and the creation of new docks still continues. For 7¼ miles on the Lancashire side of the river alone the monumental granite quarried from the Board's own quarries in Scotland fronts the river in a vast sea-wall as solid and enduring as the Pyramids, the most stupendous work of its kind that the will and power of man have ever created. Nor is this all. Immense ugly hoppers, with groanings and clankings, are perpetually at labour scooping out the channel of the estuary, so as to save Liverpool from the fate of Chester, and to permit vessels of all sizes to have a clear passage at all tides. Huge warehouses of every type, designed for the storage of every kind of commodity, front the docks, and giant-armed cranes and other appliances make disembarkation swift and easy. To a traveller with any imagination few spectacles present a more entrancing interest than that of these busy docks, crowded with the shipping of every nation, echoing to every tongue that is spoken on the seas, their wharves littered with strange commodities brought from all the shores of all the oceans. . . .

The population economically dependent upon Liverpool largely exceeds a million, and has multiplied fivefold in the course of the last seventy years.

RAMSAY MUIR.—*A History of Liverpool.* Williams and Norgate, 1907.

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The Scenery of the Isle of Man

The geology of the island is a subject on which we only treat as far as it affects the scenery. The stranger who before visiting the island has found out that the central hill range, extending from Port Erin S.W. to Ramsey N.E., a distance of 15 miles, runs from 1000 to 2000 feet above sea-level, may be surprised to hear that there is probably hardly a single yard on the whole range from which a slip of the foot could be disastrous. There are scores of minor heights similarly elevated in Wales and the English Lake District which require the greatest care in traversing. The reason probably is that Nature has gone to work in a quieter way in the Isle of Man than in the other hilly parts of the kingdom which we have mentioned.

Snaefell is as smooth and regular in its slopes as Scafell is rough and irregular. The great abruptness and ruggedness of the fells of Lakeland and the mountains of North Wales are the result of a violent contest between aqueous and igneous influences—the violent breaking through the stratified rock and scattering all around in wild confusion. In the Isle of Man, on the contrary, the volcanic influence would seem to have gently pushed up the stratification and then let the surface gradually wear itself into the natural angle of loose material, with as much ease as if it had been sand dropped from an hour-glass. Anyhow, except on the wave-worn rocks of the coast, or in the deep ravines which have been gradually scooped out by the rush of inland waters, there is scarcely cliff or precipice, and yet the geological formation of the island is to a great extent identical with that of the Lakes and North Wales—slate. The surface of nearly the whole island south of Ramsay is composed of this material.

The most disrupted part of the island is, perhaps, the long and low promontory of Langness, near Castletown, in which, on close inspection, the varied and distorted rock-forms astonish those who have expected to find a bit of greensward 2 or 3 feet above the sea. Here are a number of greenstone dykes, with old red pudding-stone in the hollows.

There is very little granite exposed in the island, a bit of the Dhoon valley and the Foxdale side of South Barrule being the only places where it appears. Along the shore north of Peel the Old Red Sandstone is developed for a considerable distance, with boulders of limestone often found in the sea close by. Limestone appears in the south. The bed of the Silver Burn from Ballasalla to Castletown is of this formation. It will also be found near Derby Haven and Port St. Mary and Poolvash Bay, where it is a black marble. Scarlet Point and Stack are a basaltic mass. The steps of St. Paul's Cathedral, London, were composed of a present of some cargoes from Poolvash Bay by Bishop Wilson.

The whole of the dull and almost flat land north of Ramsay, called the "Curraghs," is an alluvial deposit. Several lakes at one time varied the surface, as is implied by the name Bal*laugh* ("town on the lough"). Hereabouts have been found the fossilized bones of the huge Irish elk and the red-deer, whose existence on the hills we read of as late as 1702.

A. AND C. BLACK.—*Guide to the Isle of Man*, 1898.
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View from Snaefell

In one respect the Isle of Man may be considered the centre or axle of the British Isles. From nowhere else can it be fairly said that the view embraces all their four divisions, and, of course, Snaefell is the very best view-point in the island. In clear weather, not only is "the tight little island" itself mapped out beneath the eye, with the exception of a strip of the coast here and there, but Scotland is plainly visible from the Mull of Kintyre to beyond Dumfries; Ireland is represented by the Mourne Mountains; England by the giants of the Lake District; and even Wales shows up with the peak of Snowdon, the "Carnedds"—Dafydd and Llewelyn—and the range extending thence, Penmaenmawr to the Great Orme, with maybe the Clwydian range in cloud-like outline far away in the south-east. The nearest point of England to Snaefell is St. Bees Head, 38 miles distant; of Scotland, the Whithorn Promontory, 30 miles; of Ireland, the entrance to Strangford Lough, 36 miles; and of Wales, the northern coast of Anglesey, 56 miles. Scafell is 50 miles away; Merrick, the highest Scotch mountain south of Edinburgh and Glasgow, 60; Slieve Donard, the highest in the North of Ireland, 60; and Snowdon, 80.

A. AND C. BLACK.—*Guide to the Isle of Man*, 1898.
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VII.—THE CUMBRIAN LAKES

The English Lake District

On a contoured map of England the area known as the English Lake District stands out from the rest of the country as a separate region, having its own orographical structure, with a drainage system almost independent of the rest of the country. It occupies a peninsula which fronts the sea in a semicircular coast-line between Morecambe Bay on the south and Solway Firth on the north, and is marked off on the east by the deep valleys of the Eden and the Lune, which represent the chord of the semicircle of the coast. A geological map shows that in the character of its rocks also the Lake District is a distinct region; the central parts are composed of very complicated volcanic rocks of Silurian age, lavas and bedded ash, the latter often converted into slate; the Coal Measures of the Carboniferous formation, with their associated limestone, form an irregular outer ring, beyond which, again, there is another broken ring of the less ancient Permian sandstones.

The land is high and rugged in the centre, cleft by deep valleys, and this fact is interesting historically, for it was in the Lake District that the enjoyment of fine scenery was first recognized as an aim for travel.

The mountains are highest near the centre, the land gradually sinking to a low flat plain bordering the sea, and the valleys grow wider and flatter as they approach the coast. Scafell Pike, 3210 feet; Scafell, 3162; Helvellyn, 3118; and Skiddaw, 3054 feet, are the highest summits in England. The crests of the mountains are frequently rocky and rugged, the lower hills are grassy to the top, and the steep sides of many of them are draped with great screes, which give to the valleys a rounded or U-shaped section. A very heavy rainfall, in many places exceeding 100 inches per annum, insures a plentiful water-supply to the streamlets, which leap from the rocks and foam down the steep slopes to join the larger streams.

We cannot enter here into the geological history of the district. It is obviously a dissected dome of rocks, from which the covering strata have been largely stripped, and it has been severely handled by the Great Ice Age, their old moraines still clustering near the heads of the valleys, although usually washed away from the lower slopes. The rocks on the floors of the valleys and the rocky islets in the lakes are finely scratched and polished by the ancient ice.

The lakes are of two classes: (1) The small mountain tarns, usually nearly circular in form, lying in corries or on flat ridges between neighbouring heights, and always shallow. These Mr. Marr* has shown to be in almost every case the result of damming by glacial clays, although since the Ice Age many of them have eroded new channels of outlet through solid rock. (2) The lower lakes, occupying the valley floors and usually extending out into the low plain. These may possibly be formed, like the tarns, by masses of clay laid down across river valleys; they may have been excavated by glaciers; they may have resulted from crustal movements tilting up the lower ends of the valleys.

The valley lakes of the district are of two main types, the deep and the shallow. The deep lakes have an average depth, increasing from 40 feet, in the case of Haweswater, the most easterly, to 134 feet in the case of Wastwater, one of the most westerly.

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* Mr. J. E. Marr, *Geographical Journal*, 1896, vol. vii., p. 602.

The lakes lie typically in long, narrow valleys with steeply sloping sides, the lake filling up the whole breadth of the valley, and the sides continuing the slope of the hills down to an almost flat floor covered with fine mud. In the case of Wastwater, and in some parts of Ullswater, steep scree slopes are continued under water at an even steeper angle than in the air. The shallow type of lake is only represented by two, Derwentwater and Bassenthwaite, with an average depth of 18 feet, and a less simple and regular form of floor.

The two largest lakes, Windermere and Ullswater, are divided into distinct basins by shallows bearing groups of rocky islands, which would seem to indicate either a double excavation if the lake-beds were originally scooped out, or a crumpling of the strata if they were produced by crustal movements. But every one of the lakes exhibits, as Wordsworth pointed out long ago, the tendency of rivers to fill up hollows with the débris they bring down. Each small stream throws down its burden as a deltaic cone where it enters the lake, and it is curious to notice how these have developed into long stretches of flat meadow, as at the head of Windermere, or into fan-shaped flats filling up what were formerly bays; and off the mouth of these deltas the slope of the sides of the lake is always greatest, except, indeed, in the case of perpendicular cliffs, which are occasionally seen. Haweswater, although one of the least of the lakes, possesses at Measand the largest delta formed by a stream absurdly small in proportion to the work it has done.

Once, there can be no doubt, Buttermere and Crummock formed one lake; but the stream called the Mill Beck, rushing down the steep hillside on the right bank, formed a delta like that at Measand, which, aided by the Sour Milk Gill on the other side, filled the great trough right across, and now leaves only a little shallow stream flowing close along the left bank through the delicate deltaic meadow for three-quarters of a mile from Buttermere to Crummock.

Every one of the larger lakes has its own special characteristics. Windermere is the longest, has the greatest volume of water, and extends deepest below sea-level; Derwentwater is the widest, shallowest, and richest in islands; Bassenthwaite has the largest area of land draining into it; Wastwater is the deepest both in average and maximum (258 feet), but, as its surface is 200 feet above the sea, it does not descend so far as Windermere below sea-level; Coniston is the narrowest of the large lakes; Crummock is the steepest sided and flattest floored; Ullswater is the most complex in outline; Ennerdale unites the deep and shallow types; and Haweswater lies highest above sea-level, and is unique in the size of its lateral delta.

The land of the district is infertile, and only the deltas and valley bottoms can be cultivated; few cattle, although many sheep, are kept. Mineral resources were once valuable—the bloomeries of the Romans show how extensively iron was worked on the lake-sides eighteen centuries ago. The graphite of Borrowdale was once renowned, but the pencil factories, which were started at Keswick to utilize it, now put up graphite from Ceylon or Siberia in sticks of Florida cedar. Lead is still mined near Ullswater, but the beauty of the scenery is the main resource of the country, and a respectable population is maintained by the tourist traffic. The old artistic associations have been revived by the establishment of home industries—spinning and weaving, and the manufacture of artistic metal and wood work in several of the small towns of the Lake District proper—while on its margin the coal-fields of Whitehaven and the rich hematite ore of Ulverston have given rise to busy modern centres of industry. The growth of Barrow-in-Furness as a great iron-working town and seaport has been almost as rapid as that of the cities in the American Far West.

One other natural resource depends on the configuration and climate, which provide steep rock slopes and heavy rainfall. This is the supply of pure water in the vast quantities utilized in part for the electric lighting of Keswick, in part stored up in the half-artificial reservoir of Thirlmere for the supply of Manchester. It is not a little curious to observe that an appreciable fraction of the water in the Manchester Ship Canal flowed down the slopes of Helvellyn, and should, in the course of Nature, have reached the Irish Sea at Workington instead of at Liverpool.

Dr. H. R. Mill.—*Journal of School Geography*, vol. ii., 1898.
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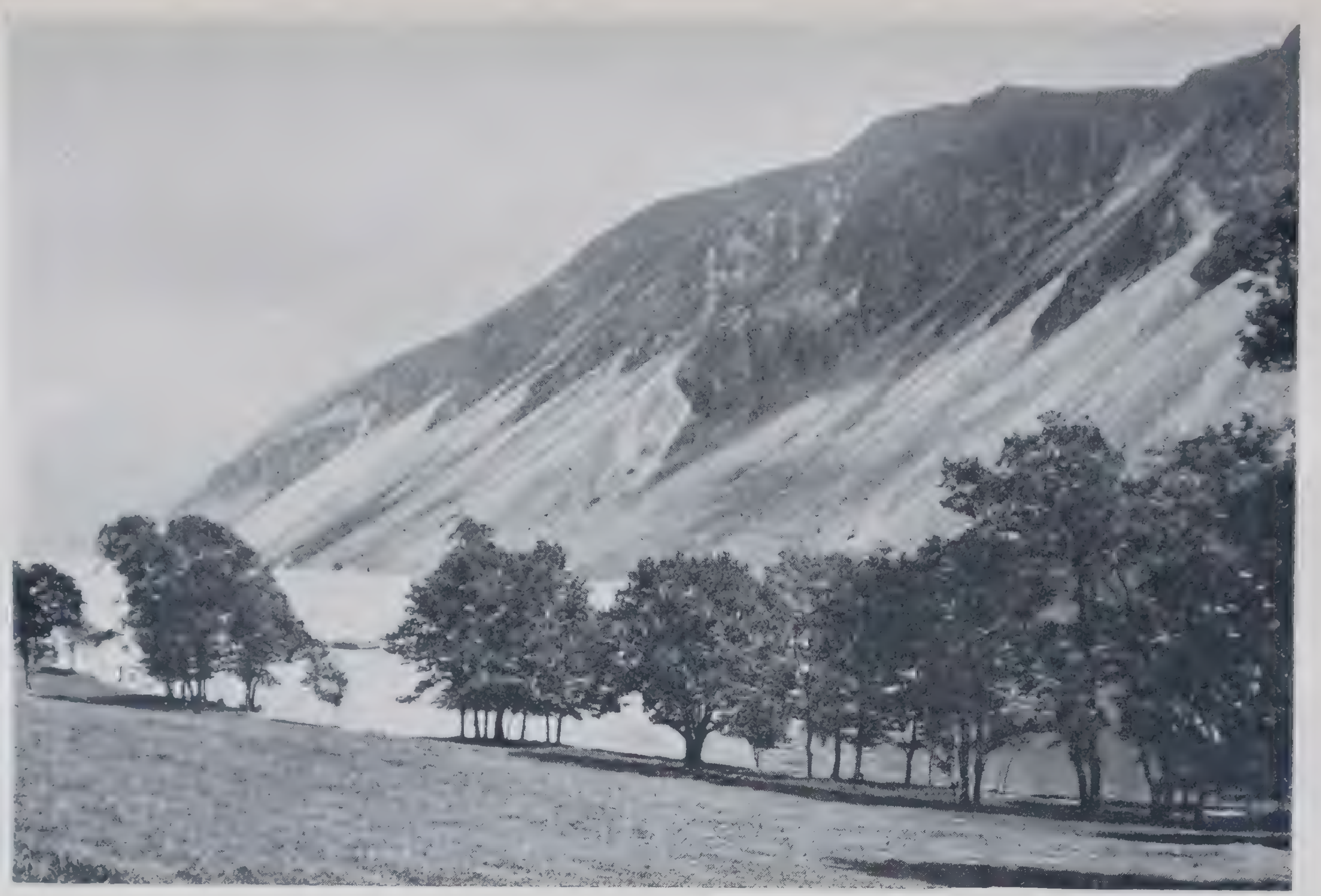
Characteristics of the Lakes

1. Derwentwater

From the geographical point of view Derwentwater is unique amongst the English lakes. All the others are comparatively long and narrow ; Derwentwater is relatively wide, giving it, when seen from a height, the appearance of a great expanse of water. Unlike the other lakes, it has numerous islands distributed irregularly over the surface, and these islands appear to be flat heaps of rough stones—at least, all of them are surrounded by gently sloping stony beaches. The area of the lake is a little over 2 square miles, and its total drainage area is almost 32 square miles.

The drainage area of the lake consists mainly of Borrowdale on the south, down which the river Derwent flows. The watershed runs very near the banks of the lake on the east and west. Physically, Derwentwater and Bassenthwaite are one lake, separated by the low alluvial plain, which extends for 2½ miles between the northern extremity of Derwentwater and the southern extremity of Bassenthwaite. The plain is so flat that it is said to be occasionally submerged in a heavy flood, when a continuous sheet of water stretches for 10 miles.



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WASTWATER, SHOWING THE SCREES.

2. Ennerdale Water

In Ennerdale Water we find the extreme example of a type of lake hinted at in Crummock, and the only pronounced specimen in the Lake District. The type is that of a narrow deep Alpine lake, widening and growing shallower towards its outlet. Loch Lomond is the best example of this form in Great Britain, and the lake of Garda on the Continent of Europe.

3. Wastwater

Wastwater, the last lake of the western radiating system, is the deepest of the whole district, and the wildest in its scenery. It lies appropriately at the base of the loftiest mountains in England, Scafell Pike and Scafell. Wastwater has an area of 1·12 square miles, the same as Ennerdale. The drainage area tributary to the lake measures 18½ square miles, being rather more than seventeen times the extent of the water surface. The axis of the lake is slightly curved, but in the main runs south-west, following the outline of the left or south-eastern bank, which is in all parts steep, and along a great part of its length is flanked with the grandest screes in the Lake District. For 1½ miles along the lower part of the lake the contour line of 1500 feet runs within 1500 feet of the margin of the lake, and at some points the average slope of the whole hillside equals 40 degrees. No definite stream flows down these screes. The right or north-western side of the lake does not present so uniform a coast-line as is furnished by the screes; the hillside is not so steep. . . . Almost one-half of the area of the lake is deeper than 150 feet.

4. Ullswater

The only two lakes of the eastern system of drainage are Haweswater and Ullswater, the latter second only to Windermere in size, and the most complicated of all the narrow lakes in its configuration.

The islands of Ullswater are all masses of solid rock, rising steeply from a great depth of water. The rocky islets all bear clear marks of ice-action, being smooth and striated.

5. Windermere

Windermere, the largest lake in England, has an area of 5·69 square miles, not including islands, and it measures 10½ miles in total length along the curved axis of the lake. Windermere receives the drainage of 88 square miles, or 15½ times its water area. Although nearly three times as large as Bassenthwaite, Windermere has a drainage area little more than half the size of that of the smaller lake.

DR. H. R. MILL. "Bathymetrical Survey of the English Lakes," *Geographical Journal*, July and August, 1895.

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VIII.—THE MIDLANDS

Birmingham and the Black Country

THE life of the Black Country is based upon a coal-field, which strikes north and south for 20 miles, from Cannock Chase to the Clent hills. The Great Western and North-Western lines, having converged upon Birmingham from Leamington and Rugby, traverse the coal-field side by side for 12 miles to Wolverhampton. Midway between Birmingham and Wolverhampton stands Wednesbury, with Walsall to the right and Dudley to the left. The whole district is one great workshop, both above ground and below. At night it is lurid with the flames of the iron furnaces; by day it appears one vast loosely-knit town of humble homes, amid cinder-heaps and fields stripped of vegetation by smoke and fumes. Birmingham, with more than half a million inhabitants, is situated just beyond the south-eastern border of the coal-field. As in the case of the other great urban communities of Britain, the core of the city has lately been reconstructed. All around are dependent industrial towns, for which Birmingham is the market. North-eastward on the Trent is the brewing town of Burton; eastward, on a small detached coal-field, are Tamworth and Nuneaton; south-eastward is the cycle town of Coventry; south-westward are the nail-making centres, Bromsgrove and Redditch, and beyond them Worcester with its potteries; westward is carpet-making Kidderminster; north-westward, near the Severn, upon another little coal field, are the iron towns of Wellington and Coalbrookdale; while northward is boot-making Stafford. Leamington and Malvern, still further afield, are in some degree residential suburbs of Birmingham. Thus all Warwickshire, Worcestershire, South Staffordshire, and Mid-Shropshire have Birmingham for the focus of their economic life, which is ultimately based on the block of Coal Measures, with rich bands of ironstone upheaved in South Staffordshire through the New Red strata of the plain.

Standing somewhat apart, at the source of the Trent, high upon the south-western spur of the Peak, and rather nearer to Manchester than to Birmingham, although just within the county of Staffordshire, is a detached industrial area, which resembles the Black Country in being placed near the elevated ground of a watershed. Here, upon a small coal-field, accessible from the Mersey by canal along the Weaver valley, are great potteries, importing clay by sea and canal from Cornwall. For 6 miles stretches what is in effect a single town, known in various parts as Stoke, Newcastle-under-Lyme, Burslem, and Hanley, with a joint population of at least 200,000.

Birmingham is at the intersection of important railways. It is about equally distant by rail from Liverpool and Bristol, and only a little more remote from London and Hull. It thus profits by the competition of four rival ports.

H. J. MACKINDER.—*Britain and the British Seas.* The Clarendon Press.

By permission of the Author.

Fruit-Growing in Worcestershire

At the present time it is estimated that in the Evesham district alone the area under market-garden cultivation reaches a total of 10,000 acres, and that the whole of the gardening area (which is not solely in Worcestershire) is from 20,000 to 25,000 acres. The economic result of the establishment of this important industry in the southern part of the county is important and interesting. Formerly the district was purely agricultural, and in the surrounding districts, still devoted solely to that industry, the tendency is for the population to decline, and the value of property to decrease.

In the gardening area the population is increasing. Next to the fertility of the soil and the climate, the most important factor in the development of the industry has been found in the facilities for distribution afforded by excellent railway services. Till the advent of the railways the industry was a very small one ; this was, of course, a necessity from the perishable nature of the produce. The opening of the Midland main line from Birmingham to Cheltenham helped matters to some slight extent, but in 1852 what is now the Great Western Railway was opened between Evesham and Worcester. Within a few years Evesham also had direct communication with Oxford and London on the east, while the Redditch branch of the Midland Railway gave it access to Birmingham and the north on one hand, and to Gloucester and Bristol on the other. The result was a great expansion of the area under cultivation. At the present time the system of distribution is nearly perfect. Through goods trains, filled with garden produce, run from Evesham every evening during the season (except Saturday and Sunday) to all parts of the country, particularly Birmingham and the north, and to South Wales ; and goods loaded at seven o'clock in the evening are delivered in the various markets early the following morning. For the Scotch traffic special through expresses leave Evesham daily about noon, delivering the produce in Glascow and Edinburgh early the next morning. From Evesham alone it is estimated that as much as 2000 tons of garden produce (chiefly fruit) is despatched per week during the busy part of the season.

George Jones. — "Worcester," *Victoria County Histories*, vol. ii.

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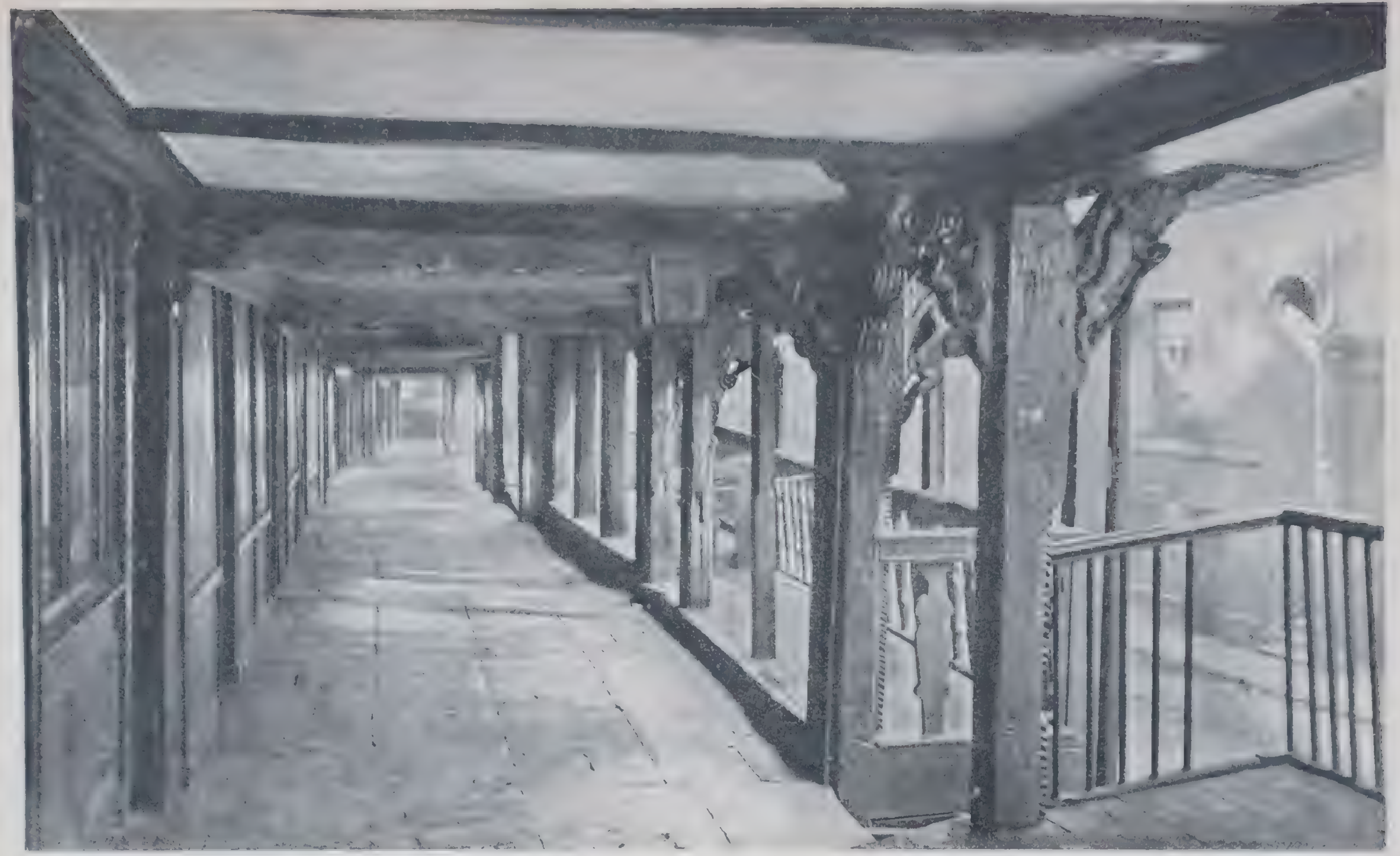
The Malvern Hills

No traveller through the western Midland counties of England can fail to have been struck by the Malvern Hills. Whether viewed from the opposite Cotswold range, from the mountains of the neighbouring border of Wales, or from the low-lying country in their own immediate district, the beauty of their outline, the splendour of their colour, the boldness with which they rise from the plain at their foot, at once attract the eye and compel the admiration. But the finest view of the range is to be obtained on some clear day in early autumn from Bredon Hill, standing nearly midway between Malvern and Cotswold.

. . . The Malvern chain is very narrow in comparison with its height, and the gradient of the hills is therefore correspondingly steep. Its total length is about 8 miles, its breadth is everywhere less than 1 mile, and more often less than ½ mile, and its highest point, the Worcestershire Beacon, is 1395 feet above the sea-level, according to the Ordnance Survey. Within this narrow base area there are about twenty summits, which are arranged in one or two longitudinal rows. Between them lie hollows and passes, through which the various roads crossing the range find their way.

From the summit of Worcester Beacon, as, indeed, from any of the peaks, an extraordinarily expansive view is to be obtained both to the east and to the west. There seems no doubt that, given favourable conditions, part of at least fifteen counties in England and Wales, and perhaps even two or three more, may come into sight. To the north, the characteristic and unmistakable hump of the Wrekin is nearly the limit; to the south, the Mendips; to the west, possibly Plinlimmon; and to the east, Bardon Hill, a part of Charnwood Forest in Leicestershire. Three cathedrals—Worcester, Hereford, and Gloucester; six of the great religious houses of Catholic days—Evesham, Tewkesbury, Pershore, Great and Little Malvern, and Deerhurst; and six also of the great battlefields of English history—Evesham, Worcester, Tewkesbury, Edge Hill, Shrewsbury, and Mortimer's Cross—such are some of the objects included in the prospect presented from almost any of the higher Malvern peaks.

B. C. A. WINDLE.—*The Malvern Country.* Methuen, 1901.
By permission of Messrs. Methuen.



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ONE OF THE MOST PICTURESQUE OF THE ROWS AT CHESTER.

The upper floors project over these covered footways.

IX.—WALES AND THE WELSH MARCHES

Characteristic Features of Wales

WALES acquires its semi-independent position as an integral part of South Britain from historical considerations, but these are direct consequences of its position and configuration. Physically the Welsh highlands include the hills of Shropshire, Hereford, and Gloucester west of the Severn, as well as the county of Monmouth, which is grouped for all practical purposes, and especially for statistics, along with Wales, though actually part of England. Although the Shropshire hills are of no great height, they are picturesque and prominent features, and stand in close agreement with the geological structure. The Malvern Hills rise in the vale of Severn, much as Charnwood Forest rises above the plain of the red rocks in the north of the Midlands.

The loftiest and most picturesque of the Welsh mountains are those of the north-west, which rise in two distinct divisions. Of these the Snowdonian group culminates at 3560 feet in Snowdon, the loftiest mountain south of the Scottish Highlands. Its flanks are trenched by valleys, in many of which small lakes or tarns still remain. The whole group of Snowdonia has a very high rainfall on account of the abruptness with which the mountain slopes rise from the level of the sea, fronting the wet west wind. This, with the centre of the Lake District and a portion of the North-Western Highlands of Scotland, can claim the distinction of being one of the few spots in Europe with

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MENAI STRAITS.

a mean annual rainfall exceeding 100 inches. The industry of the district lies mainly in the great slate-quarries; but the coast is lined by health resorts, of which Llandudno, by reason of its sheltered situation and mild, dry climate, is the chief. To the south and east, beyond the valley of the Dee, which contains Bala Lake, the largest natural body of fresh-water in Wales, the Berwyn Mountains form another belt of high ground running nearly at right angles to the trend of Snowdonia. While the steep north-western face of the mountain group drains through the Dee to the Mersey, the gentler south-eastern slopes discharge the copious rainfall through long valleys to the Severn. In one of these a great reservoir—Lake Vyrnwy, as large as Coniston Water—has been constructed for the supply of water to Liverpool. The great reservoir has a special geographical interest, for it has been formed by reconstituting an ancient lake-bed, and so restoring a feature of pre-Glacial topography. This section of North Wales is for the most part uninhabited except for villages in the valleys, and the larger part of the population continue to speak no language but Welsh, so great is the isolation of the district from external intercourse.

Mid-Wales, between the valleys of the Severn and the Wye, is a rough plateau rising on the east, and still higher on the west, above the level of the centre. The eastern elevations culminate in Radnor Forest; the western form a nearly continuous chain, the Mynydd Bach, running at first south and then south-westward from Plinlimmon. On the eastern flanks of this ridge new reservoirs for the supply of water to Birmingham have created two large and picturesque lakes in the valley of the Elan, a tributary of the Wye. This western ridge is not crossed by a railway for nearly 60 miles, and it has formed an almost complete barrier to communication between east and west.

The South Wales uplands are separated from those of the north by the vale of Brecon, through which the Usk flows south-eastward. They culminate in the Brecon

Beacons, the slopes leading up to which from the south are deeply scored by parallel valleys of southward drainage, cutting through the Coal Measures, and consequently the scene of enormous activity in coal-mining and iron-smelting. All the principal valleys, and many steep and difficult gorges, are traversed by railways, linking the mines and blast-furnaces with Swansea, Cardiff, Barry, and Newport, the ports of shipment on the coast of the plain of Gwent. This regien acquires imperial importance from its mines of anthracite, the smokeless coal which is peculiarly adapted for the furnaces of warships. The dense populations of the narrow valleys are still so recent that they have hardly given rise to any towns ; even Merthyr Tydvil is in plan and appearance scarcely more than an overgrown village, though it houses over 100,000 inhabitants. Barry Dock was excavated in 1888 amongst the sand-dunes on a desolate piece of coast in order to afford a new outlet from the coal-fields of the high valleys to the sea, and within a few years it ranked as one of the great seaports of the world. The compact group of the Black Mountains between the Usk and the Wye is a wild and desolate district, though on the margin of the fruitful plain of Hereford.

Dr. H. R. Mill.—*Geographical Journal,* December, 1904.
By permission of the Author.

Snowdonia

It is the special glory of Capel Curig that it lies, not in a sunken hollow, but on an open upland, some 700 feet above the sea, where the air, even at the hottest noontide, breathes crisp and bracing from the hills. The distance from Bettws-y-Coed is only 5 or 6 miles by road ; in climate the difference is one that no mileage can express. From the low, moist woodlands you mount gradually up till you reach the point where the Llugwy River winds in a series of rocky falls round the base of Moel Siabod ; then there is a bend, and yet another bend, in the valley, and you find yourself in St. Curig's shrine. Great mountains are all around you, but there is a sense of space and freedom, with wild slopes of grass and rock stretching up and back to the higher ridges that lie behind. One is not oppressed, as so often in mountain districts, by the nearness of the overhanging heights. By climbing one of the low hills that border the junction of the streams, you may learn the general features of the place at a glance.

Facing westwards, with your back to Bettws-y-Coed, you look into two bare, bleak, converging valleys, of which the southern is topped by the clear-cut peaks of Snowdon, the northern by the bulky range of Carnedd Llewelyn, while between them is the great mass of the Glyders. You are face to face with the wildest region of North Wales, a foreground of broad, marshy moorland, where you see little life but an occasional herd of black cattle, and a background of mountains that rise above 3000 feet; yet the dreariness of the scene, so striking in its first impression, is relieved and varied on fuller acquaintance by the unsuspected tenderness that it enfolds. Simple and severe as the outlines are, there lies between them a wealth of loveliness that no intimacy can exhaust—lakes and mountain streams unsurpassed for purity and freshness, and crowning all the great circle of mountains, which for ever attracts and holds the eye without laying a burden on the mind.

Capel Curig, as a glance at the map will show, is the ideal centre for the exploration of Snowdonia, lying as it does at the junction of the two chief valleys, from which any of the mountain ranges may be approached. . . . The sense of severity and aloofness which haunts these mountains, as compared with the Cumberland "fells," is due chiefly, no doubt, to their sterner physical features and to the greater depth and bleakness of the bare valleys which intersect them, each group of peaks rising apart, like a mountain system of its own; but we Saxon visitors are also moved, perhaps, by a feeling of racial strangeness

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PASS OF LLANBERIS.

in a land which has no interpreter for us, no literary associations such as those by which the English lakes are endeared—nothing but a dim record of earlier inhabitants, with wild tales of battles and feuds, insurrections and invasions, now alike buried in the past. We seem to be looking on savage mountains in a foreign land.

Next to the fact that they fall into the three great groups of Snowdon, the Glyders, and the Carnedds, with Moel Siabod and the heathery moorlands that link it to Cynicht and Moelwyn, forming a boundary on the south-east, the first point that strikes the watcher of these stimulating heights is that they offer, for the most part, a precipitous face on their northern or eastern fronts, while to the south and west they sink less formidably, though often with great steepness, to their dividing "bwlchs." This structure is very marked in the central range of the Glyders, where for 4 miles round the head of Nant Ffrancon the great escarpment looks down on the waters of Lake Ogwen.

* * * * *

When we turn from the Glyders and Tryfan, still in their primitive state of utter wildness, to their great neighbour Snowdon, scarred and maimed by copper-mine and steam-engine, the change is a striking one: it is like passing from a perfectly preserved work of art to some broken monument, the torso of a giant form. Capel Curig, as I have said, is the point from which "Snowdon and all his sons" (to use Pennant's quaint expression) are best seen. To ascend from Llanberis or Beddgelert is to go up by a back staircase, in neglect of the front one, a mistaken course at any time, and doubly so now that the summit has been spoiled, and the interest of the mountain in great part shifted to its attendant peaks, which rise on the Capel Curig side.

But if the glory of Snowdon lies in its shapely ridges, and of the Glyders in their wilderness of rocks, it is for the very different qualities of breadth and bulk that we admire the great mountain range of which the centre and crown is Carnedd Llewelyn. Look at a graded map of Carnarvonshire, and you will note that this conspicuous group, extending from the steep spur of Carnedd Dafydd, above the shore of Lake Ogwen, to the sea-washed promontory of Penmaenmawr, comprises a much greater *extent* of high ground—say of over 3000 feet—than either Snowdon or the Glyders: and, owing to its larger area, its hidden recesses are wilder, more desolate, and more primitive, than any other hill-tract in North Wales. Sharp peaks it has none, but in places there are huge crags and precipices; nor are there wanting grand ridges, such as the rocky isthmus that unites Pen Helig to Carnedd Llewelyn, or the high saddle between the two Carnedds themselves; but for the most part what impresses one in these mountains, as compared with those already described, is the greater spaciousness of their massive wind-swept heights and the greater openness of their outlook, both skyward and seaward.

For those who love such wilds nothing is better than a long day's wandering in the heart of this secluded district, whether the start be made from the Capel Curig quarter, or from Nant Ffrancon on the west, or from the Conway valley on the east, or from the northern sea-coast at Aber; in any case there is need of strong and steady walking to surmount the marshy slopes, the haunt of plover and curlew, by which the great Carnedd is encircled, and to place oneself on the high plateau above. The compass, too, will have to be brought into play if there are clouds on the hills, for nowhere are mists more bewildering than on those vast moorlands, where there are no natural signposts for our guidance, and where the bare grassy spaces stretch away for miles without a distinguishing mark.

H. S. SALT.—*Cambrian and Cumbrian Hills*, 1908.
By permission of the Author.

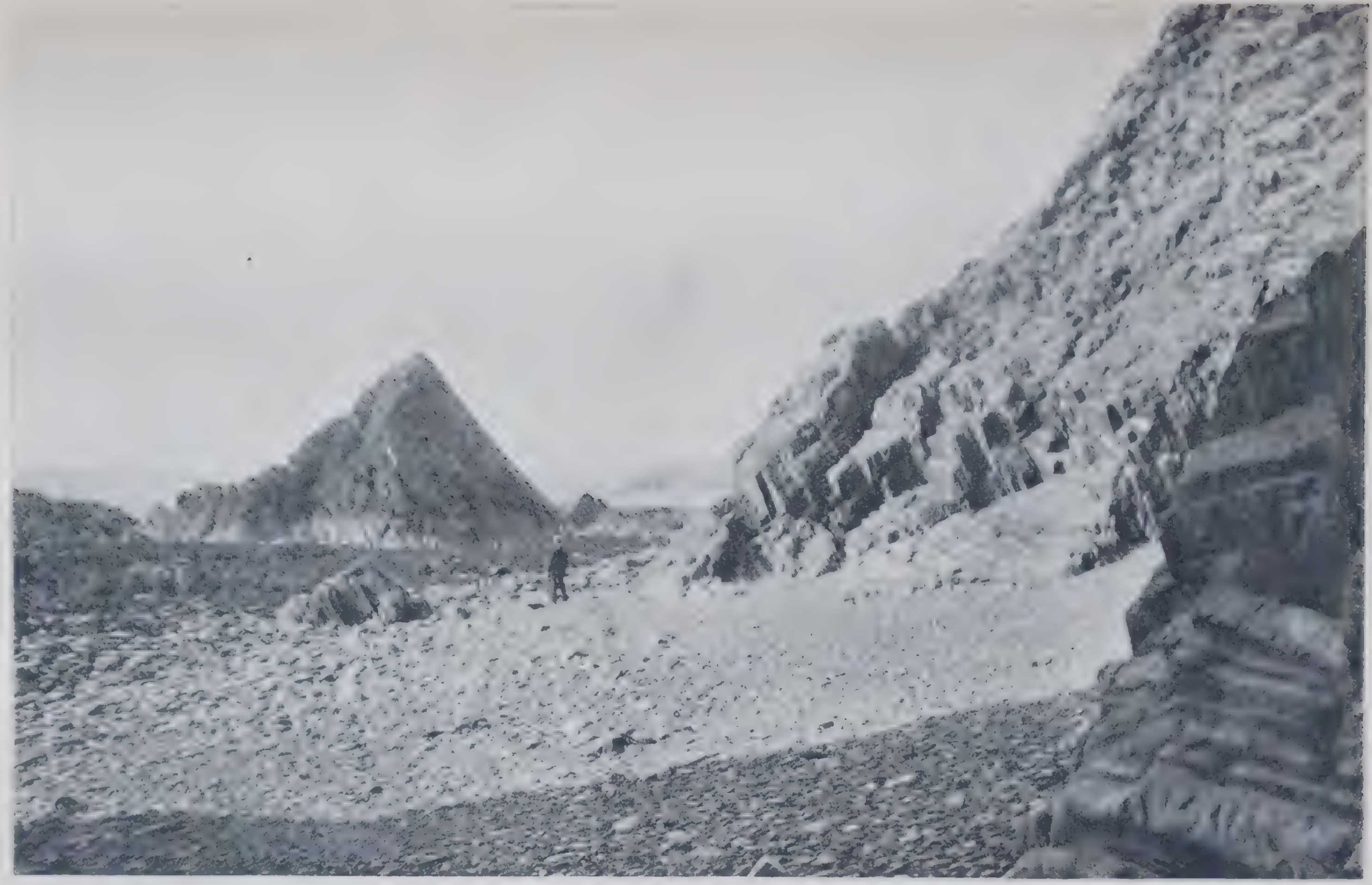
South Wales

South Wales is rich in attractions for the general tourist, the artist, and the antiquarian. The country is almost everywhere hilly or mountainous, and much of it is more than 1000 feet above sea-level. At the same time, though "over the mountain" is the general term locally applied to the old roads and short cuts from place to place, it should be borne in mind that south of Cader Idris and the Arans the only ground in Wales really attaining to the character and proportions of mountains is the long range of Fforest-fawr, or the Black Mountains, extending from Herefordshire and Monmouthshire, across Breconshire into Carmarthenshire, and culminating in the shapely sandstone peaks of the Brecon Beacons (2910 feet), as graceful a mountain outline as any in the Principality. There is no finer rambling-ground in South Wales than that of the Black Mountains northward from the Usk valley. The Wye valley affords a fine approach to them in the opposite direction. The Carmarthen Van, forming the western buttress of Fforest-fawr, presents a finely scarped peak to the north-west, and affords a charming view of the vale of Towy. Otherwise, the "Old Red," of which this range chiefly consists, assumes a square-topped and somewhat artificial appearance in its summits northwards, while southwards it sinks gradually in bare, featureless slopes, cleft by the numerous river-courses which carry off its abundant waters into the Bristol Channel. Many of these valleys, once very beautiful, have been so marred by coal-mines and iron-works that few travellers in search of the picturesque will visit them.

Of the high ground lying on both sides of the eastern border of North Cardiganshire, and extending northward to Plinlimmon (2469 feet), the greater part consists of sheep-walks, diversified at best with rounded summits, and here and there a grassy peak or rocky scarp of minor importance.

A. and C. Black's *Guide to South Wales.*

By permission of Messrs. A. and C. Black.



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THE BEACH AT ABERYSTWITH.

Notice the tilted strata.

The Vale of Towy

Right in the centre of the pass, with our road twisting round its foot and quite isolated from either of the mountain ranges which here press together, springs up the pointed peak of the Sugar Loaf. A notable landmark in this part of Wales, it stands like a sentinel between two widely sundered districts, the basins of the Wye and the Towy—between the land of Norman rule in old days and that of the Welsh princes. To-day it marks the scene of one of the most striking engineering achievements in Wales. Above all, it looks out, with wonderful dignity of pose and far-stretching limit of vision, over the famous vale of Towy, that from its pointed summit can be traced wandering for 40 miles through shadow and sunshine, amid the green ridges or the dark hills which seem to cover the whole surface of Carmarthenshire.

The summit is barely 1500 feet above sea-level, and perhaps 400 from the road below. . . . How the beacon fires of war must have blazed on this green cone when princes from below or barons from above went a raiding! For through a gap at the back signals could readily be flashed across the Wye to Radnor Forest, while to the front the whole world of South-West Wales could be roused to fear or passion by a single torch!

. . . Llandovery stands not literally at the head of the vale of Towy, but near where that river, after a 20-mile course through mountain gorges and narrow valleys, meets the Gwydderig and the Brân in a more spacious country, running thence for nearly 30 miles to the tide-water at Carmarthen, amid scenery of a different class and with a temper more suited to its changed surroundings.

Famous in Welsh life, Welsh history, and Welsh song is this vale of Towy. Putting aside Glamorgan, who turns her great humpy back towards the rest of Wales, and hugs her fatness and her treasures between the mountains and the sea-coast, the vale of Towy is the heart of South Wales, as Carmarthen is its capital. In the days of Welsh princes it was the political centre of the southern kingdom, and, save Glamorgan, a province unto itself from earliest times, the richest, or at least the most distinguished, strip of old South Wales. Here, as was natural, men, and consequently warriors, were thicker on the land than elsewhere, and here was a rallying-point for the native chieftains of the south in their long struggle with the Anglo-Norman power. Glamorgan fell under Norman rule in the person of Fitz-hamon and his twelve companion knights in the days of Rufus, as Brecon and Radnor succumbed to the sword of Bernard de Newmarch. But Carmarthen and the vale of Towy kept the native interests alive, and the Norman from all serious footing, till, simultaneously with North Wales and Llewelyn, it fell before the invincible Edward, and, happily for itself, jumped at once from a native province into a royal county. As arms and men and flocks abounded here in the days of the Plantagenets, so, for the same reason, do country-houses, prosperous or ancient families, and fine farms, distinguish the vale of Towy at this time above most parts of South Wales. Something of what the vale of Clwyd is to the north that of Towy is to the south, though, strangely enough, while the former was, till quite recent times, the peculiar stronghold of the Anglo-Norman families, the latter has boasted a larger share than common of the ancient Welsh blood among its ruling class. Yet in both these notable tracts the Welsh language holds its own among the tenantry with tolerable obstinacy.

. . . The vale of Towy does not invite comparison with its sister valleys of the Wye and the Usk, any more than would the vale of Clwyd with its more rugged rivals of the Conway and the Dee. Those intimate with Wales will recognize that the analogy, though not complete, is by no means an inapt one. The vale of Towy has its own peculiar charm, its own environment—above all, its own strenuous memories. It needs no saying that these last are, in part, the outcome of its gracious fertility, amid a land upon all sides wild and rugged by comparison. It was a land to fight for, and to hold, and to live in, and, as I have before remarked, was the heart of old South Wales.

A. G. BRADLEY.—*Highways and Byways in South Wales.*
By permission of Messrs. Macmillan.

Carmarthen

Carmarthenshire is almost wholly an agricultural, or, to be precise, a pastoral, county; but its surface is so varied that to generalize upon rents and labour, crops and customs, would be impossible. Labour, perhaps, may be briefly dismissed as almost non-existent. In nearly all parts of South Wales this somewhat indispensable commodity is not merely scarce, but has disappeared altogether. The typical Welsh farmer, with a fifty-acre, or, in local parlance, a "forty-pound," farm, can scrape along without it; but in Carmarthenshire, and about the vale of Towy, there are many large holdings whose owners twenty or thirty years ago were doubtless more than happy at having achieved such measures of consolidation. True, all tillage possible has been abandoned, but even with large dairy farms you must have labour, and I cannot imagine what these hapless "big men" do. The wealth and abounding industry of Glamorganshire quite overwhelm the rest of South Wales, and seem to suck the rural districts almost dry of labourers—and who can wonder? Everywhere in South Wales one sees abandoned cottages falling into ruin in leafy hollows or gorse-clad hillsides; quite often indeed, in such romantic or sequestered spots, as the inconvenient dwellings are naturally the least sought after and the first to be vacated. The pathos, however, that attaches to a weed-covered hearth-stone or a vanished roof-tree has not the direct significance it would have, let us say, in Tipperary. It is deplorable, beyond a doubt, that any portion of a lusty peasantry should vanish off the land, and still more so that land should go out of cultivation for lack of labour. But no tears need be dropped, or harrowing tales of eviction and starvation conjured up, at the sight of these abandoned cots, unless it be for the farmer who remains behind. They are not signs of Welsh poverty, but of Welsh wealth. Their former inmates have not left the country, but merely stepped over the Black Mountains into the next county, where they can earn twice as much as the very respectable wages they had been already earning here—under much less pleasant conditions, to be sure, and very often in the bowels of the earth.

A. G. BRADLEY.—*Highways and Byways in South Wales*
By permission of Messrs. Macmillan.

The Breconshire Beacons

No active individual could possibly remain long in Brecon without being seized with a desire to ascend the Beacons. The Black Mountain range fills the entire background across the Usk valley, extending to the verge of sight both upon the east and upon the west. But these two peaks, Pen-y-fan and Corn-du, the highest of all, rise immediately opposite Brecon, with a dignity and beauty of form and colouring that must make most other places seem tiresome to live in for exiled Breconians of taste and feeling. Near as they look, however, from some points in the town, and in some atmospheric conditions almost as if they might fall and crush it, it is a good step of some 3 or 4 miles for the aspiring climber who would tramp, even by the shortest path, to their feet.

But the way to make the most of the country, enjoy the day, and mount the Beacons, is to cycle up the Merthyr road, which climbs the highest pass that is crossed by a first-class road in all Wales. The ascent is gradual and easily rideable, and at a point 9 miles off, and an elevation of nearly 1400 feet, a lonely inn, known as the "Storey

Arms," looks down over a wild country towards Glamorganshire. The road leaves the vale of Usk by means of a tributary stream, the Tarrell, and follows it up to its source among the bogs.

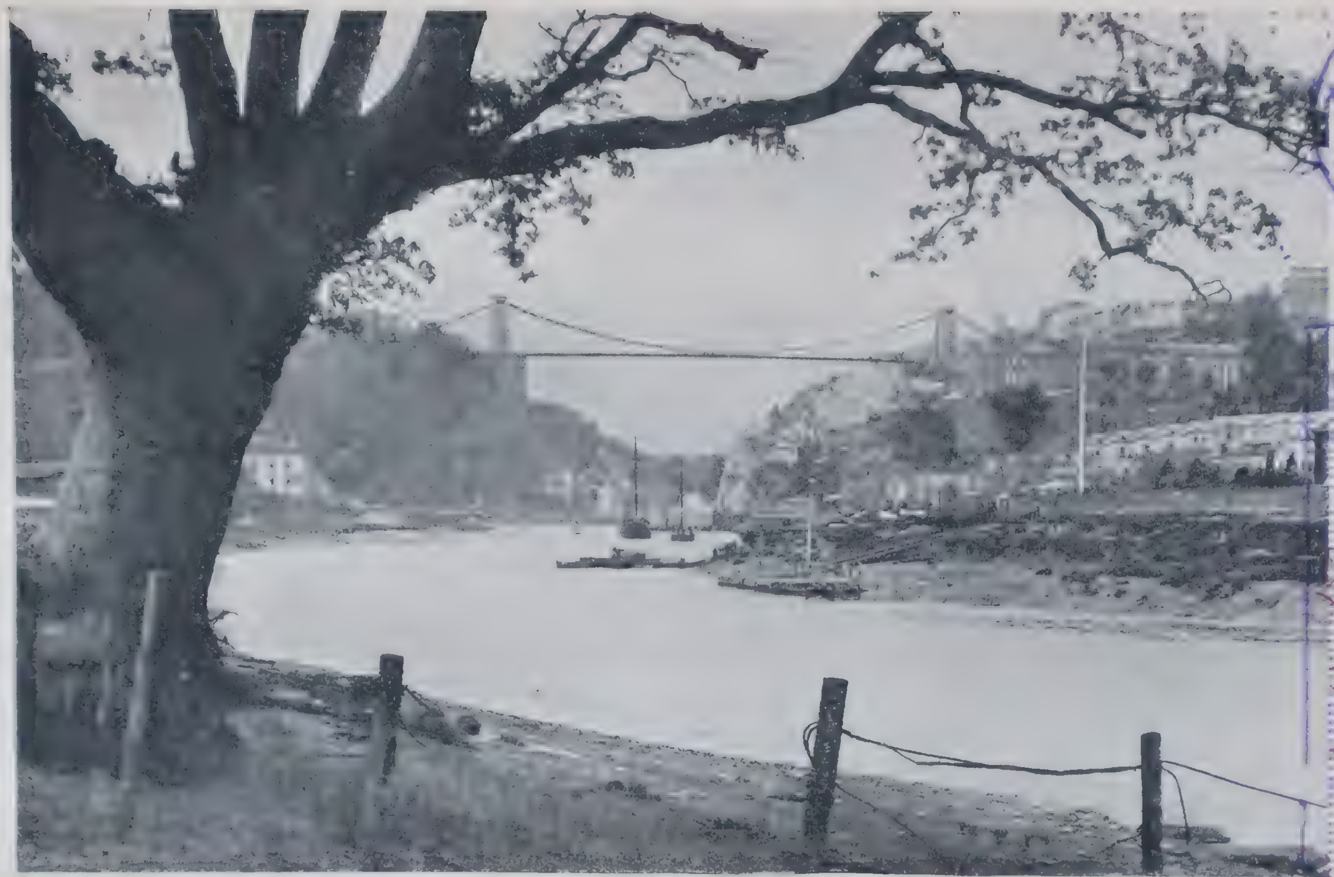
A. G. Bradley.—*Highways and Byways in South Wales.*
By permission of Messrs. Macmillan.

The Severn and the Bristol Channel

Notwithstanding the proud sentiment of nationality, and the possession in common of an independent mother-tongue, North and South Wales are now for many purposes more intimately connected with the adjoining parts of England than with each other. Wales was the massive upland refuge of the Britons when driven from the English plain, but the growth of a Welsh State has always been hindered by the transverse lie—east and west - of the chief valleys and coast roads. As early as the eleventh century alien strongholds were planted along the Upper Severn, and a wedge of Englishry forced between the North and South Welsh. In modern times the tendency has been accentuated by the increase of coastwise traffic to Liverpool and to Bristol, the construction of trunk railways from London to Holyhead and to Milford, and the development of the coal-fields of Flint and Denbigh on the one hand, and of Glamorgan on the other.

The counties of the Lower Severn and South Wales may therefore be regarded as constituting a single group by virtue of their physical and economic relations. From Worcester to Gloucester the Severn flows southward parallel to the Malvern ridge, but from Gloucester it turns south-westward, and gradually broadens into a trumpet-shaped estuary. This is sharply constricted where islets in mid-channel, the Steep and Flat Holms, indicate the lie of the denuded Mendip upfold.

Within the Holms the Severn estuary receives three rivers from the north, the Wye, the Usk, and the Taff; and



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CLIFTON AND SUSPENSION BRIDGE.

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one from the east, the Bath Avon. It flows through a broad alley, floored with New Red clay, the high escarpment of the Cotswolds being to the left hand, and the faulted edge of the Malvern Hills and of the Forest of Dean to the right. Two small Carboniferous uplands pierce the New Red floor, the one bearing the Bristol coal-field, the other that of the Forest of Dean. The Avon and the Wye intersect these uplands, making picturesque gorges through the Carboniferous Limestone at Clifton on the one hand, and on the other between Monmouth and Chepstow.

West of the Malverns and north of Monmouth spreads the fertile Herefordshire plain, formed of Old Red Sandstone, and differing therefore in nature from all other portions of the English lowland, although resembling certain parts of Scotland. From its western margin rises the dark edge of the Cambrian upland, through which emerge by deep-cut notches the eastward valleys of the Upper Wye and Upper Usk. Immediately to the south of the Usk valley, in the Brecknock Beacons, are heights of nearly 3000 feet, and from these a series of parallel streams, of which the chief is the Taff, descend south-eastward into the Severn estuary.

The Romans founded a great colony at Gloucester, where they bridged the river; but establishing themselves also at Bath, and among the lead-mines of the Mendips, they had occasion to institute ferries lower down the Severn, at points subsequently known as the Old and New Passages, the former now marked by the Midland Railway Bridge to the Dean collieries, and the latter by the Severn Tunnel. The New Passage, being placed below the mouth of the Wye, gave direct access to the great legionary centre of Caerleon on the Usk, thus avoiding the traverse at Chepstow. From Gloucester to Caerleon, and along the coastal sill into Pembroke beyond, the road leads across the lower reaches of a series of rivers, and here in consequence have sprung up since Roman times a succession of towns, each a bridge place and a port—Chepstow, Newport,

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HORSESHOE BEND, NEAR CHEPSTOW.

Cardiff, Neath, Swansea, and Carmarthen. Similarly, the way from Gloucester towards Exeter crosses the Bath Avon at a point immediately above the Clifton gorge, and here Bristol has been built, beside a bridge and at the head of navigation.

The industry of the region now centres in the two great towns of Bristol and Cardiff. Bristol grew to importance in connection with the trade to Ireland, incidentally, no doubt, maintaining the detached English colony in Pembrokeshire, and it still has a great importation of Irish cattle. But after the discovery of America the merchants of Bristol adapted their resources to the new trade in colonial produce, and still have great commerce in sugar, tobacco, and cocoa. The West Indian fruit-trade promises a modern development of the same traffic. In rear of Bristol is a range of small towns, extending from Trowbridge on the Avon to Stroud, in a transverse valley of the Cotswolds. Here the wool of the Cotswolds was woven, and, with the aid of Bristol coal, the West of England cloth industry has been maintained, even against the competition of the West Riding of Yorkshire. Under the shelter of the Cotswold edge are the two large residential towns of Cheltenham and Bath.

Cardiff, Newport, and Swansea, with inland Merthyr Tydvil, are dependent upon the great coal-field of South Wales, whose coal, largely of anthracitic character, is the chief source of the smokeless fuel employed by the war fleets and the mail steamers of the world. It is the one raw product still exported on a vast scale by Britain. Ores of iron and other metals are imported to South Wales, and, together with such iron ore as is produced locally, are smelted in its furnaces, especially for the making of rails and in connection with the tinplate industry. At Pembroke, on Milford Haven, is one of the minor dockyards of the British Navy, and a base for defence both of the Bristol and the St. George's Channels.

Hereford presents a singular contrast both to the barren uplands which border it on the north-west, and to the busy fields of industry which lie around it in other directions. It is one of the most rural districts yet remaining in England, and with its red soil, red cattle, and apple orchards, is enriched with many a landscape suggestive of Devonshire. A gulf of oceanic warmth and moisture extends up the valley of the Severn between the Cotswold edge and the Welsh upland.

H. J. MACKINDER.—*Britain and the British Seas.* Heinemann.
By permission of the Author.

X.—THE SCARPLANDS

By G.W.R. to the Cotswolds

WHO will fly with me westwards to the land of golden sunshine and silvery trout-streams, the land of breezy uplands and valleys nestling under limestone hills, where the scream of the railway whistle is seldom heard, and the smoke of the factory darkens not the long summer days? Away in the smooth "Flying Dutchman," past Windsor's glorious towers and Eton's playing fields, past the little village and churchyard where, a century and a half ago, the famous "Elegy" was written, and where, "hard by those rugged elms, that yew-tree's shade," yet rests the body of the mighty poet Gray. . . . Soon we are flashing past Reading, where Sutton's nursery gardens are bright with scarlet and gold, and blue and white. But there is no need of garden flowers now, when the fields and hedges, even the railway banks, are painted with the lovely blue of wild geraniums and harebells, the gold of bird's-foot trefoil and St. John's wort, and the white and pink of convolvulus or bindweed. We are passing through some of the richest scenery in the Thames valley. There on the right is Mapledurham, a grand medieval building, surrounded by such a wealth of stately trees as you will see nowhere else. . . . As we pass onwards many other country houses, with their parks and clustering cottages, add their charm to the view. There are the beautiful woods of Streatley; hanging copses clothe the sides of the hills, and pretty villages nestle amid the trees. But soon the scene changes.

The glorious valley Father Thames has scooped out for himself is left behind; we are crossing the chalk uplands. On all sides are vast stretches of unfenced arable land, though here and there a tiny village, with its square-towered Norman church, peeps out from an oasis of green fields and stately elm-trees. On the right the Chiltern Hills are seen in the background, and Wittenham Clump stands forth—a conspicuous object for miles. The country round Didcot reminds one very much of the North of France. Between Calais and Paris one notices the same chalk soil, the same flat arable fields, and the same old-fashioned farm-houses and gabled cottages.

But now we have entered the grand old Berkshire vale. . . . This vale is full of fine old trees; but in many places the farmers have spoilt their beauty by lopping off the lower branches because the grass will not grow under their wide-spreading foliage. It is only in the parks and woodlands that the real glory of the timber remains.

. . . High up on the hill the old White Horse soon appears in view, cut in the velvety turf of the rolling chalk downs. But, in the words of the old ballad,

The ould White Horse wants zettin' to rights.

He wants "scouring" badly. A stranger, if shown this old relic, the centre of a hundred legends, famous the whole world over, would find it difficult to recognize any likeness to a fiery steed in those uncertain lines of chalk. Nevertheless, this is the monument King Alfred made to commemorate his victory over the Danes at Ashdown. So the tradition of the countryside has had it for a thousand years, and shall a thousand more. . . .

The view from the hill is a very extensive one, embracing the vale from Bath almost to Reading, the whole length of the Cotswold Hills as well as the Chilterns, stretching away eastwards towards Aylesbury, and far into Buckinghamshire. Beneath your feet lie many hundred thousand acres of green pastures, varied in colour during summer and autumn by golden wheat-fields, bright with yellow charlock and crimson poppies. It has been said that eleven counties are visible on clear days. . . .

This Great Western Railway runs through some of the finest bits of old England. Not long ago, in travelling from Chepstow to Gloucester, we were fairly amazed at the surpassing beauty of the views. It was May Day, and the weather was in keeping with the occasion. The sight of the old town of Chepstow and the silvery Wye, as we left them behind us, was fine enough; but who can describe the magnificent panorama presented by the wide Severn at low tide? Yellow sands, glittering like gold in the dazzling sunshine, stretched away for miles; beyond these a vista of green meadows, with the distant Cotswold Hills rising out of dreamy haze; the azure sky overhead flecked with clouds of pearl and opal, and all around the pear orchards in full bloom. . . .

At Kemble, with its old manor-house and stone-roofed cottages, we say good-bye to the vale of White Horse, for we have entered the Cotswolds. Stretching from Broadway to Bath, and from Birdlip to Burford, and containing about 300 square miles, is a vast tract of hill country, intersected by numerous narrow valleys. Probably at one period this district was a rough, uncultivated moor. It is now cultivated for the most part, and grows excellent barley. The highest point of this extensive range is 1134 feet, but the average altitude would not exceed half that height. Almost every valley has its little brook. The district is essentially a "stone country," for all the houses and most of the roofs are built of the local limestone, which lies everywhere on these hills within a few inches of the surface. There is no difficulty in obtaining plenty of stone hereabouts. The chief characteristics of the buildings are their antiquity and Gothic quaintness. The air is sharp and bracing, and the climate, as is inevitable on the shallow, porous soil of the oolite hills, wonderfully dry and invigorating.

Barley does uncommonly well on the light limestone soil of these hills. The brewers are glad to get Cotswold barley for malting purposes. Fine sainfoin crops are grown, and black oats likewise do well. The shallow, porous soil requires rain at least once a week throughout the spring and autumn. . . .

In September, as you walk over the fields, the Cotswolds are seen at their best. Somehow or other a country never looks so well from the roads as it appears when you are in the fields. The man who prefers the highroad had better not live in the Cotswolds, for these roads, mended as they are with limestone in the more remote parts of the district, become terribly sticky in winter, while the grass fields and stubbles are generally dry as a bone. There is but a small percentage of clay in the soil, but a good deal of lime, and 5 inches down is the hard rock ; therefore this light stony soil never holds the rain, but allows it to percolate rapidly through, even as a sieve.

" Lands of gold have been found, and lands of spices and precious merchandise ; but this is the land of *health.*" Thus wrote Richard Jefferies of the downs, and thus we say of the Cotswolds.

J. A. Gibbs.—*A Cotswold Village.*
By permission of John Murray.

Chair-making at High Wycombe

In the district of the Chiltern Hills beech woods are a valuable source of revenue, and the soil and climate especially favour their growth. Beech succeeds best when it is self-grown. The acreage of the beech woods in the Chiltern Hills is roughly 20,000 acres or more. The southern portions of the Chiltern Hills have been renowned for their beech woods during many centuries, and this immediately available supply of raw material was undoubtedly the cause of the establishment of the industry which, according to records, existed in 1793. At that period, and for many years, the industry was a scattered one, carried on as a rural industry in the wood, or in the home and the small workshop. Workers were few, until gradually the tendency to centralize took place, and High Wycombe, being favourably situated, became principally identified with the industry.

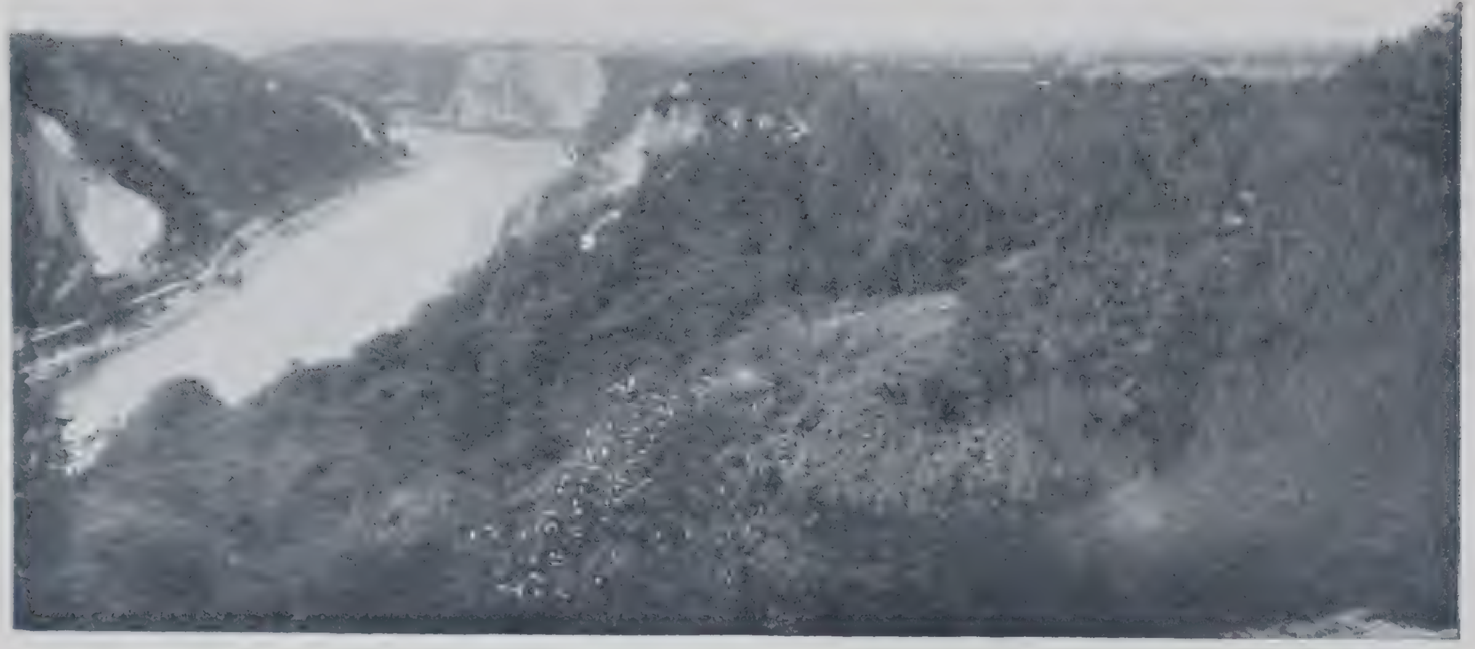
To-day there are in High Wycombe, and adjacent thereto, between 100 and 120 factories, employing approximately 5000 hands. But in the last 100 years, during which the chair industry at High Wycombe has been growing up, the material has changed, and the proportion of home-grown wood now used is entirely altered. Instead of wholly using beech, the industry does not now consume 10 per cent. of local material for all the chairs turned out at High Wycombe. Over £100,000 worth of timber is imported annually. At the same time, practically all the beech grown on the 20,000 acres of wood in the Chiltern Hills goes to High Wycombe. The value of this annual produce is only £20,000 out of the annual £100,000 worth of timber used by the industry. The area under woods in the Chiltern Hills might be largely increased with profit. The bulk of the imported wood is Canadian and American birch, very like beech in fibre.

The extent of the chair trade in the district may be realized when I state that, according to an expert authority, the annual output has reached 4½ millions of chairs per annum. With the exception of Russia, every European country has dealings with Buckinghamshire. So also have the United States of America, Canada, South America, New Zealand, and Australia, and latterly South Africa has been opened up.

Minutes of Evidence, Departmental Committee on Irish Forestry, April, 1908.

Somerset

Few counties in England present so great a diversity of scenery as Somerset, and none possesses a greater variety



F. Frith & Co.

CLIFTON DOWNS, SHOWING THE GORGE CUT BY THE AVON THROUGH THE CARBONIFEROUS LIMESTONE.

of geological formations. Although the land nowhere attains the dignity of a mountain, yet the older rocks, which form the more solid framework of the county, stand out boldly on Exmoor and in the Quantock Hills of West Somerset, in Crook Peak, and other portions of the Mendip Hills, and rise to a lesser elevation on Broadfield Down, in North Somerset.

On the elevated moorlands of Exmoor and the Quantocks the heather, dwarf oak, and whortleberry abound, and the red-deer in places runs wild. On the tablelands of Mendip and Broadfield Down, amidst wild and cultivated tracts, we find excellent pasturage for sheep The Oolitic and Liassic uplands are partly under plough cultivation, while the slopes of these stonebrash hills are studded with orchards. The clay vales of Lias and New Red Marl form rich pastures, and the levels in particular are noted grazing and dairy lands, one of the products being the famous Cheddar cheese. More than half the land is under permanent pasture, and the county is essentially an agricultural one: but it is by no means wholly so—there are mines of coal and iron, famous building stones, fullers' earth, peat moors or turbary lands, lime and cement works, and formerly there were important mines of lead and zinc, of which the refuse heaps are now worked.

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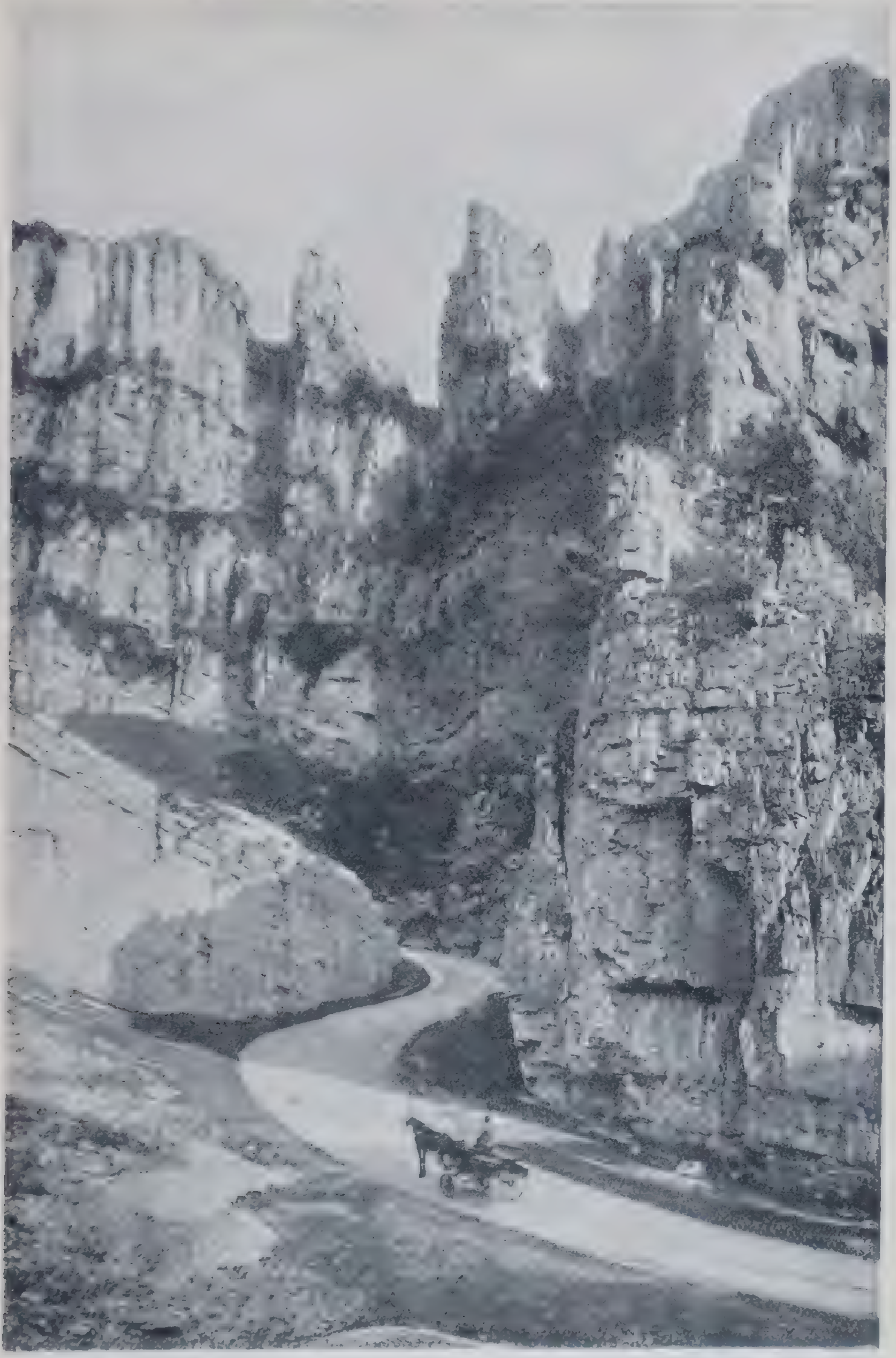
The Carboniferous or Mountain Limestone forms some of the more picturesque parts of Somerset, and it well deserves the name of "Scar Limestone," which it received in the North of England, on account of the numerous scarps of rock which characterize the land. In Somerset it forms the mass of the Mendip Hills, with its many charming rocky gorges, combes, and caverns, as at Cheddar, Ebbor, Burrington, and Frome on the Mendips, at Cleeve and Brockley on Broadfield Down. While, however, the rock frequently appears at the surface, there is elsewhere a rich red soil, a residue from the decomposition of the rock, and this supports an excellent herbage for sheep.



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THE CHEDDAR GORGE, IN THE LIMESTONE FORMATION OF THE MENDIPS.

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A fine section of the rocks is to be seen in the gorge of the Avon, where it cuts Leigh Down in Somerset, and Clifton and Durdham Downs in Gloucestershire

Near the suspension bridge at St. Vincent's Rocks the famous Hotwell spring of Clifton issues from the higher beds of the Limestone at the rate of 60 gallons per minute. at a tolerably uniform temperature of 70° Fahr. Its principal constituent is carbonate of lime. It contains also salts of soda and magnesia, but only to the extent of 44 grains to the gallon.

The thermal waters of Bath probably arise also from the Carboniferous Limestone. Judging by their temperature - 104 to 120° Fahr.—Prestwich suggested that the depth from which they come is about 3500 feet. Hence they may be regarded as natural artesian wells, fed perhaps. to some extent, from the sea, which in the Severn estuary is bordered in places by Carboniferous Limestone, and this rock also rises up in the Holmes islets. The chief ingredient in the waters is sulphate of lime, with also sulphate and chloride of sodium and chloride of magnesium. etc. Altogether they contain from 144 to 168 grains per gallon. and the discharge is about 385,000 gallons daily.

The Bath waters often bring up sand, as well as nuts, insects, and even fossils, from the alluvial deposits and other strata through which they emerge. Moreover, they leave a deep red ochreous deposit, and tinge with a red colour the bordering rocks.

The surface of the Carboniferous Limestone is so fissured and jointed that water readily finds its way downwards, and impurities are also readily washed in. Hence, while considerable reservoirs of water occur in fissures and caverns below ground, there is no certainty of finding a copious and wholesome supply at any particular spot.

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Many of the great fissures on Mendip, originating along joint planes or lines of fracture, have been so enlarged as to form a series of caverns, and in some cases, where erosion has proceeded further, a deep ravine has resulted. The solvent action of carbonated water, aided by frost and streams, mainly contributed to produce the effect.

In the case of Cheddar the dip has exercised much influence on the shape of the cliffs, the one side with the inward dip standing up boldly and precipitously, while the other, the dip slope, affords abundant evidence of disintegration, showers of detritus now and then falling on to the road, and in old times into a deep natural gully. The cliffs are perhaps the finest of their kind in England, and they rise at one point to a height of 420 feet above the level of the road.

Several of the streams which issue at the foot of the Mendip Hills take their rise from swallet holes in the Carboniferous Limestone of the plateau. Among these are St. Andrew's and other springs at Wells, the Axe, which issues at Wookey Hole, and the Cheddar Water. These waters, flowing through limestone areas, carry away much carbonate of lime in solution; but under certain conditions they redeposit it on the roofs and floors of caverns in the form of stalactites and stalagmites, or elsewhere in pipes.

H. B. Woodward, F.R.S., F.G.S.—"Somerset," *Victoria County Histories*, vol. i.

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The Cave District of the Mendips

Across Somerset the range of the Mendips, a region of Old Red Sandstone and Carboniferous Limestone, 1000 feet above tide-level, stretches in a huge flat-topped rampart for nearly 30 miles, from the town of Frome to the sea. No piece of country in the kingdom offers so much to explore. An abundant harvest is there waiting to be reaped, for on every side are obvious indications of half-buried gateways to the dark and secret pathways to the nether-world, and everywhere upon the surface of the Mendip tableland lie the open pits and hollows which the local speech calls "swallets"—that is to say, swallow-holes—some of them dry, some actively engulfing streams, but all testifying to untold ages of water action.

This Limestone district lies far from the busy hives of industry, remote and secluded in the very heart of Somerset. Only on the darkest of nights, with the clouds low in the sky, can the glare of the lights of Bristol be seen reflected far to the northward. One main line of railway, the Great Western from Bristol to Exeter, passes near it, and even that does not intrude beyond the margin of this Caveland. The rendezvous for the cave-explorers of the district is usually the quiet little city of Wells, lying calm and secluded under the southern slopes of Mendip, in close proximity to all the principal caverns. A mile to the south-east rises the bold and picturesque Dulcote Hill, a fragment of the most southerly anticline of Mountain Limestone in the kingdom. From this point rolling northward is a great fivefold anticline; Old Red Sandstone, Lower Limestone, Shales, and Mountain Limestone form the great mass of the worn-down stump of the once mighty Mendip range. The extent of the denudation which has taken place indicates that this range was originally at least 5000 feet high, yet now in but a few places is the height of 1000 feet attained, and this is reached only by the Old Red Sandstone ridges laid bare in the prolonged course of that denudation. The first of these high ridges rises boldly to the north of Wells, and a steep climb of 900 feet in 2½ miles brings us to the summit of Penhill or Rookham, from which a grand view southward is to be obtained. Immediately below the three cathedral towers pierce the blue mist hanging over the little city we have just left. Beyond the peat moors of the Brue and the Axe stretch away to the island of Avalon, sacred as the birthplace of our Christian faith in England. Here below us is that

> "Island valley of Avilion,
> Where falls not hail, or rain, or any snow,
> Nor ever wind blows loudly; but it lies
> Deep-meadow'd, happy, fair, with orchard lawns,
> And bowery hollows crowned with summer seas."

Here, where Arthur's bones are said to have been found, and where traditions associated with him abound, his memory is kept green in the names of many well-known spots; and yonder lies Cadbury Camp, looked upon by many as the Camelot of romance. On the low ridge which intervenes between the valleys of the Axe and the Brue lies Wedmore, where King Alfred gained in the Peace of Wedmore such temporary respite from his foes as allowed him to gather strength for the great operations that resulted at last in the conquest and unity of the whole kingdom. Yonder, too, are the marshes of the Parrett and the Tone, around which cluster tales familiar to every child.

In the marshes between the Mendips and Glastonbury exploration has unearthed a most interesting example of a swamp or lake village, with great store of antiquarian material, throwing a flood of light upon a period of which little was known. Beyond lies Sedgemoor, where in 1685 took place the last battle ever fought on English soil.

In the far distance the sunshine glints on the waters of the Bristol Channel, where 60 miles away the bold promontory of the Foreland rises sheer from the sea. . . . Only a pleasant walk away the great chasms of Ebbor and Cheddar have rent the rocks asunder, forming two of the loveliest ravines in the kingdom. Northward across the intervening syncline of Mountain Limestone, pitted with swallets marking the entrances to many an unknown subterranean labyrinth, are seen the Old Red Sandstone summits of the North Hill, crowned with its seventeen Neolithic barrows, and of Blackdown beyond, from whose bare top is seen the broad estuary of the Severn spreading out across the view, giving a glimpse of the coast of South Wales in the far distance, its busy factories showing their pencil-like chimneys against the dark hills behind. In the Channel the little islands of Steepholm and Flatholm mark the line of the original continuation of the great Mendip range into South Wales. The Limestone shores of the former rise sheer from the sea, forming an impregnable fortress. Here, far below the level of the salt water around, a supply of pure water is obtained from the Limestone, brought doubtless from the Limestone area of Mendip by way of some hidden fissure.

The Nether World of Mendip. Baker and Balch.
By permission of Mr. E. A. Baker.

Stonehenge

It would be difficult to find a building more likely to invite speculation than Stonehenge. There is a grandeur even in its situation which adds immensely to its interest, standing as it does in the centre of a vast open plain, where till very recently no sign of husbandry was to be seen, nor any dwelling nor marks of occupation by living man. Every part of the plain is dotted with little groups of barrows, marking the monuments of chiefs who had no means of recording their deeds or even their names, but trusted to the rude mounds of earth and the pious memories of their children to transmit to posterity the memorials of those acts they seemed so anxious to perpetuate. When viewed from a distance the vastness of the open tract in which Stonehenge stands takes considerably from its impressiveness, but when the observer gets close to its great monolithic masses the solitary situation lends to it a grandeur which scarce any other building of its class can be said to possess. Its diameter is greater than the width of the portico of the Parthenon at Athens, the outer circle of stones being 108 feet, or almost exactly the internal diameter of the dome of St. Paul's. The outer circle is composed of forty stones, each standing 13 feet above the soil, and joined by a single architrave nearly 3 feet in height; within these stand the five great trilithons, rising in height from the pair nearest the entrance, which stand nearly 20 feet above the soil, to the great central group, which reaches 25 feet in height. The two uprights

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STONEHENGE.

measure each 26 feet 3 inches, but about 4 feet are buried in the soil. Between the outer circle and inner trilithons stand some twenty stones, about 6 or 7 feet in height, though how disposed it is not easy now to ascertain; and within the choir or central oval some ten or twelve more in pairs, two being placed symmetrically a little in front of each of the openings between the great trilithons. All of these are of a different stone, porphyry or granite, brought from a distance, and were probably votive stones, added after the original design was completed. With the exception of these thirty or thirty-two smaller stones, all the original parts of the temple are composed of Sarsens or grey Wethers, a fine siliceous sandstone found deposited in thin crusts in the bottom of the valleys all over the Wiltshire downs. The Stonehenge blocks have been rudely chiselled and squared into the required shape, but the exposure to the weather during fourteen centuries has so eaten away the softer parts, and the lichens have so rounded off the sharper edges, that there is, perhaps, no monument in contemplating which we are more inclined to forget man's agency, and in the chaos of ruin in which it now exists to fancy we are looking on some freak of Nature which had fashioned these gigantic masses and heaped them together in such unfamiliar forms and such strange confusion.

From all we know we have no reason to believe that before the Roman Conquest the Britons were capable of moving such masses, or of fashioning them down with such art, or of arranging them with such regard to architectural effect. If we admit the end of the fifth century to be the true epoch of the erection, this is easily understood, for the Britons had then the advantage of all that was taught them by the Romans. It also explains why Stonehenge alone of these circular buildings was erected with hewn stone, and with a view to a complicated architectural effect, for its reputed founder was by descent a Roman, and having been educated as such he naturally strove to instil some of the art of his ancestors into the works of his subjects, while Avebury and the other buildings of purely British origin still retained the impress of the rude conceptions of uncivilized races.

Quarterly Review, July, 1860.

Towns and Villages on the Chalk

From its absorbent nature Chalk always contains much water, but does not give it out freely; but whenever this formation spreads over wide areas, its surface, whether covered by later deposits or not, is everywhere streaked with shallow furrows, marking the lines of denudation. In some cases these furrows contain at their bottom rivers or tiny rivulets, in many other cases not, but in all of them water is to be found at their bottom. Hence, also, in these furrows are mostly to be found the villages on the Chalk, and their course is frequently marked out by strings of villages. Villages of greater importance and small towns are sometimes met with at the junction of two such furrows, or where several such furrows meet to form a well-marked, though by no means deep, hollow; and in such hollows lie Hitchen, in Hertfordshire, and Royston, on the borders of Cambridgeshire and Herts, both on the route of the Icknield Way, and many places in Norfolk and Suffolk, Hampshire and Wilts.

For the same reason that strings of villages are met with in furrows on the surface of the Chalk they are to be found at the base of the Chalk, either on the Chalk itself or on the margin of adjoining formations. Many of these lie on the Upper Greensand, which is mostly a water-bearing formation, and in some places, more particularly in the Weald, yields a remarkably fertile soil, rich in soluble silica, and hence particularly well adapted for the growth of wheat.

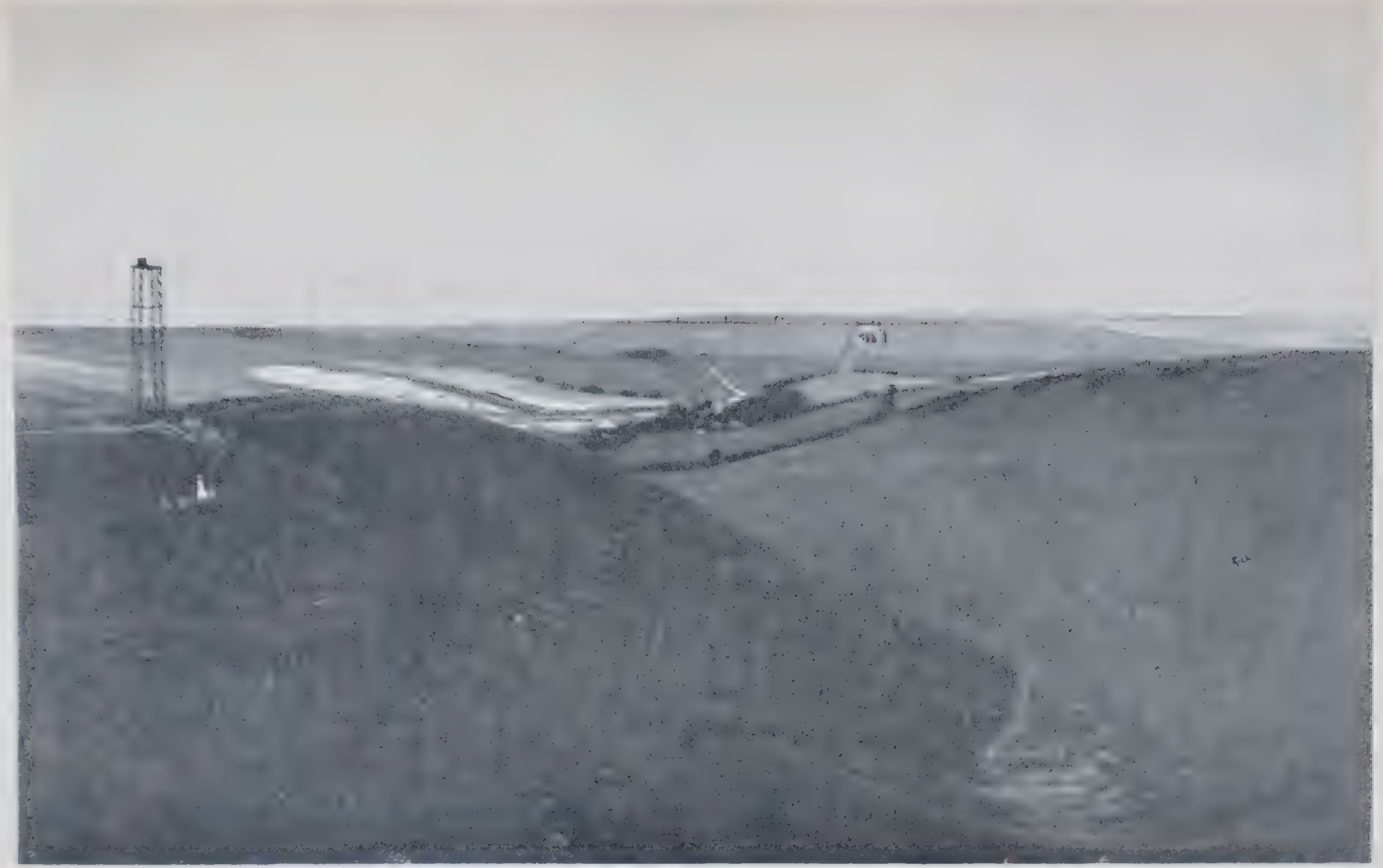
In the north-west of Norfolk the western base of the

Chalk is accurately marked by a line of villages from Castle Rising to Snettisham. From Inkpen, in the south-west of Berkshire, through the north of Hampshire and Surrey and West Kent to Greenwich, where the Chalk reaches the river, the margin of the Chalk and the Lower London Tertiaries is marked by a continuous line of towns and villages; the eastern base of the Chalk in Lincolnshire is marked by a line of villages winding, on the whole, south-south-east; and in the North Riding of Yorkshire the north base of the Chalk cliffs to the south of Derwentdale or the vale of Pickering is accurately marked by a close-set line of villages along the road—a little south of the railway —from New Malton to Filey.

Where, from any cause, a gap exists running through the Chalk, obviously the village which lies at that gap at the base of the Chalk tends to be a point of convergence for roads leading to the gap. Now, it is characteristic of the North and South Downs that they are both cut through by the principal streams draining the Weald, and accordingly we find that more or less important towns lie at most of these cuttings, at the base or on the margin of the Chalk.

At the west end of the Hog's Back the town of Farnham lies in a hollow close to a well-marked breach, through which now runs the London and South-Western Railway. At the east end of the Hog's Back the Wey, after describing a curve to the south, crosses the Chalk on its northerly course to the Thames, and at the crossing-place stands Guildford, in a depression indeed, but still mainly on a Chalk foundation.

Eleven miles in a direct line farther east the Mole similarly breaks through the Downs, and at this opening stands Dorking. About 7 miles farther east the escarpment of the Chalk begins to trend north-eastwards, to the mouth of one of the deepest of those now riverless furrows to be found in this ridge—the furrow leading to Croydon, now followed by the Brighton line from London Bridge;



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DEVIL'S DYKE, BRIGHTON.

A fissure in the Chalk, which had its origin in a huge landslip.

and just below the point where the north-easterly trend begins stands Reigate—that is, "ridge-gate."

* * * * *

Still farther east the North Downs are traversed by the Darent, the Medway, and the Stour, towards which the Chalk slopes down on both sides; and at or near the entrance to the furrows of these rivers stand Sevenoaks, Maidstone, and Ashford, while at the northern margin of the Chalk valley of the Stour, on an expansion of brick-earth, stands the city of Canterbury.

The South Downs, again, are pierced in the order from west to east by the Lavant, the Arun, the Adur, the Ouse, and the Buckmere, though the importance of the towns or villages at or near the breaches made by these rivers is diminished in some cases by special circumstances.

West of the Weald the main ridge of the South Downs is continued westwards through the south of Hampshire and Wiltshire, and in these counties the breaches made in it by the Itchen and Avon respectively are marked by the cities of Winchester and Salisbury.

G. C. CHISHOLM.—"The Distribution of Towns and Villages in England," *Geographical Journal*, January, 1897.

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The Quantocks

The Quantock Hills on a summer day are a quiet dreamland. Amongst the golden gorse or beneath the scented boughs of the fir-trees, through which the sea breezes pipe merrily, the hours flit quickly by. Let the wanderer take a vantage-ground, and from some high, yet sheltered, spot, curtained from the rough north-west and snug in its wealth of oak coppice, survey the landscape below him.

Surely the outlook from this Somersetshire hill is wide and noble. To the north, in the far distance, fold after fold, height after height, the mountains of South Wales, slanting down towards the golden west, reveal themselves.

ramparts in the background of those ancient regions of Monmouth and Glamorgan. In front extend the long seascape and the busy mart and harbour of Cardiff, with its smoke-laden atmosphere sobered down into the mellowed glow of a Cyclops forge, whose blows are inaudible, but whose life and mighty power are guessed from the swift passage of funnelled steamers, outward and inward bound, as well as from the slower progress of white-canvassed sailing-ships, tacking hither and thither athwart the streak of the yellow Severn Sea. Now and then the weird sounds of the sirens drift across and wake the dim echoes of the foreshore, and at night the old hills look upon a watery street of fairy lights. In the Channel itself rise the two notable islands, Steepholm and Flatholm.

Along the eastern horizon facing the Quantocks, and running in an almost parallel line, lie the Mendips. Below Mendip, and in the hollow of those everlasting hills, just where the sacred water, known as St. Andrew's Well, bubbles up from the limestone, there rises that stately western front of Wells Cathedral, unrivalled in itself, and flashing back the beams of the setting sun.

Shifting our vantage-ground from the northern eminence of Dousborough to the southern highlands of Broomfield, the wanderer will behold another landscape. Yonder lie acre after acre, mile after mile, of fertile marshland, part of the valley of the river Parret. Formerly this melancholy tract, swarming with legions of wildfowl, lay across this trough of West Somerset as a flooded mere or inland lake. More fruitful is the famous vale of Taunton Deane, stretching west and south. . . .

If we ask for a closer definition of the Quantock country in itself, it may be described as a region watered by those Quantock brooks which, on the south and east, find their way into the valleys of the Tone and Parret, and, on the west, thread the valley that parts the Brendon from the Quantock country. In shape the whole tract forms, roughly speaking, an equilateral triangle, with a base of about

15 miles, lying along the shores of the Severn Sea, from Start Point, at the mouth of the Parret, on the east, to Doniford and Watchet on the west.

The Quantocks are not unlike a bit of Scotland transplanted into Somersetshire. There is wildness in the moorland, but it is redeemed by the tender beauties of the well-tilled, deep-pastured valleys. The slopes themselves are soft and rounded, and the combes are deeply and heavily wooded almost everywhere, unlike the ridges of Exmoor or Dartmoor. The eye will never see a bare or rugged boulder, for all the nakedness of Nature is covered on the Quantocks with a soft mantle of purple heather. The soil is warm and red-looking, lying on the New Red Sandstone formation. The tall green ferns wave in masses everywhere, and furnish a warm bed wherein the stately Quantock stag may couch the livelong day, until, towards night, he and his fellows roam like grey shadows upon the ridges.

Rev. W. H. P. Greswell.—*The Land of Quantock*, 1903.

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XI.—EAST ANGLIA

The Physical Features of the Norfolk Broads

THE rivers that drain the eastern slope of England have, on the whole, a somewhat similar course—they rise on the eastern side of the series of hills that forms the main watershed of the country; they flow with a gradually decreasing gradient till they expand into a triangular estuary widely open to the sea. Such is the case with the Tees, Tyne, and Thames, and the rivers that unite to form the Humber and the Orwell, or that flow into the Wash. In the case, however, of the Yare and its tributaries, the Waveney and the Bure, which drain the region between the Fenlands and the Orwell, the conditions are very different: instead of the large, broad-mouthed estuaries, the entrance is very narrow, and the river expands behind into an extensive sheet of water. The shoaling, moreover, has not resulted in a series of long banks parallel to the main flow of the water, as in the Thames, or in broad flats of marsh, either on the sides, as in the Humber, or at the head, as in the Wash; the rivers flow through tracts of land formed—at least, in the upper part of the course—more by the growth of water-plants than by the actual deposition of mud or sand; and, finally, the rivers remain comparatively insignificant streams, while the main water area is formed by the isolated sheets now so well known as the Norfolk Broads.

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The Broads themselves occur in a somewhat triangular area, with the coast-line from Lowestoft to Horsey as the base, and Norwich as the apex. A substratum of chalk occurs over the whole area, covered by the clays, etc., of the Lower Eocene along the eastern margin. Neither of these, however, are here seen at the surface, which is mainly occupied by gravels, glacial deposits, the alluvium of the old estuary, and the sand-dunes that line the coast. Three rivers—the Bure, Yare, and Waveney—traverse the district. If one stands upon the sand-dunes along the Norfolk coast—as, *e.g.*, at Horsey—and looks out seawards, one notices lines of breakers parallel to the shore. These are due to shoals, and, if we examine them, the coarsest material is found at their north-west end, indicating that the movement of the drift and beach material is here from north to south. The explanation of this movement must be sought in the peculiar circulation of the tide in the southern part of the North Sea. The main tide sweeps round the North of Scotland, and, being concentrated by the contraction of the sea, it strikes with full force against the projecting coast of Norfolk, and drives along it to the south. When the northern tide begins to lose power, the southern tide that has been piled up in the English Channel forces its way into the North Sea, and, as its passage through the Straits of Dover has given it a north-easterly set, it consequently follows the Continental coast. The circulation in the south part of the North Sea thus forms a great eddy, the tide sweeping south along the East Anglian coast, and returning along the opposite shores, where the main projections, such as that of North Holland, continued by Texel and other islands, point to the north. The fact that the tide practically always flows southward along this part of the English coast has the effect of piling up the sediment on the north sides of the mouths of the rivers, and the gradual continuation of this action results in pushing them farther and farther to the south. Thus the Yare now opens at Gorleston, 2 miles to the south of Yarmouth, instead of its original mouth at Caistor, 3 miles to the north. Yarmouth itself was crossed during the passage, and the site of the present watering-

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OULTON BROAD.

place was a submerged shoal so late as A.D. 1000. Similarly the Alde, which opened at Aldeburgh, on the north side of Orfordness, has cut a new course behind the London Clay hill at that point, and now opens to the south of it. The mouth of Waveney was no doubt once at Lowestoft, but as this was barred, and as it was prevented travelling south by high land, it turned north and joined the Yare.

The Hundred Stream is reported by tradition to have opened to the sea at Horsey, and such is by no means improbable. If so, its mouth was blocked, and it had to reverse its flow and become a mere tributary of the Bure.

The same southerly drift has affected other parts of the eastern coast. Thus, to it is due the great projection of Spurn Head; but in the case of the Humber, the river is sufficiently large to prevent its mouth from being seriously interfered with, and thus it has been but slightly deflected to the south. In the case of the Thames the land to the north could not yield such masses of glacial boulders and other débris as the sea had to work with in Norfolk.

The influence of this barring of the rivers would be to at once check the velocity of the current at the mouth. The water striking the bar would immediately drop its load of débris, and thus strengthen the barrier by forming a shoal on the inner side.

J. W. GREGORY.—*Natural Science*, July, 1892.

Agriculture in Lincolnshire

Lincolnshire is the next county in size to Yorkshire, and perhaps the most important and richest agricultural county in England. The population, except for a slight mixture of Danish blood, is purely English, and the occupation almost wholly agricultural. Agricultural machinery, with a world-wide reputation, is manufactured. Lincolnshire was first colonized by the Iberians, and afterwards by the Welsh, who were eventually driven out by a

Belgian tribe. When the Romans landed, the chief tribe was that of the Coritani, a branch of the Iceni, and these were put down by the Romans in the year 70. The good work the Romans did lives after them, for they raised banks to keep out incursions of the sea, and cut dykes (such as Fossdyke, Cardyke, etc.), and made roads, of which the Ermine Street, Fosse Way, and Salt Way are lasting examples. They also built many towns.

The county is watered by the Witham, the Ancholme, the Trent, the Welland, and other feeders, and half of it is wolds and uplands, the other half being plain, almost level with spring-tide height. In the west are some hills lying along the side of the Trent, but generally the land is low. The shores also are low and sandy, and there is not a great deal of shipping and trade, as might be expected. But instead of this the county is noted for its grazing and rich pasture lands, and for the high state of cultivation of the arable land.

Much of the land has been extensively drained, and some parts of it laid under warp, both with the best possible results. There were at one time vast tracts of moorland and rabbit-warren, but these have all been broken up, the Wolds brought under tillage, and the country devoted to the growing of corn and turnips. Much of the soil is diluvial and alluvial. Now there are enormous quantities of potatoes grown on the Trent side and in South Lincolnshire, supplying the bulk of English-grown potatoes for the London market.

The Wolds extend from Barton to Spilsby, a line drawn by way of Caistor, Market Rasen, and Horncastle, representing the inland boundary. Lincoln Heath, that fine barley-growing district, consists of a strip some 4 or 5 miles wide, extending from Lincoln to some distance below Grantham, and a very similar strip of land extends northwards from Lincoln to beyond Kirton. Yet this very heathland was once a dreary waste, and the well-known landmark, Dunston Pillar, was erected as an inland lighthouse to guide belated travellers. The fenland, too, once a huge morass extending from Cambridge to Lincoln, is now converted by drains into one of the greatest potato-growing districts in the country. An account of the conversion of a tract of 40,000 acres, embracing the Wildmoor and East and West Fens, may be given as an illustration of the system adopted. Originally a chain of lakes, from 3 feet to 6 feet deep, bordered by great crops of reeds, the bottom consisted of a blue clay under a loose black mud, 2 feet to 2½ feet deep. The water was first drawn off, the mud became fertile soil, the plough appeared, and so generous was the land that, though the cost had been estimated at £400,000, or 10s. an acre, it yielded two and even three crops of oats in succession, of not less than 10 quarters to the acre, valued at £2,000,000, thus leaving a profit of £1,600,000. That district is so nearly on a level with the sea, that when the tide is up there is not fall enough in the drains to carry the water seaward, and so the mouths of the drains are furnished with gates, which, opening from within, allow the drainage water to pass into the sea at low-water, but are automatically closed by the rising tide. A catch-water drain was cut at the foot of the higher ground to intercept the water flowing thence, and this was carried across the fen by a separate drain.

First windmills were used and then steam for pumping the embanked districts, and a scheme by which the Welland was made to cut a new and deeper channel through the yielding bottom by means of artificial banks proved a most valuable adjunct to the whole system of drainage. To begin with, two rows of faggots were laid some 20 yards apart on the mud at low-water, which, after a few tides, were found to be full of a substance called "warp," a mixture of fine sand and mud, which rendered them fairly solid. Another tier of faggots was then laid on the first, and soon became embodied with them by the warp; and so the embankment rose till above high-water level, and the Welland was confined between its new banks, and began to dig out a new channel, some 3 miles into the sea. At the beginning of the nineteenth century this reclaimed fenland was letting at over £1 an acre, its previous value, a quarter of a century before, being from 1s. 6d. to 7s. an acre, and the cost of conversion varying from 5s. to 25s. an acre.

Most of the Isle of Axholme (lying to the west of the Trent) was once under water, and would be now if the embankment were neglected, as it is mostly below high-water mark. It is now well drained by a system of canals and side vents, and is one of the most fertile and productive tracts in the county. In bygone times the farmers used to attend Doncaster Market in boats.

G. E. COLLINS.—"Lincolnshire," *Victoria County Histories*, vol. ii.

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Fisheries of East Coast

The east coast of this country has long held a paramount position in our sea-fisheries. That the two Humber ports—Hull and Grimsby—receive between them as much fish in the course of the year as all the remaining ports of England and Wales put together is a fact borne out by reference to available statistics. To this premier position in steam trawling may be added the enormous landings of winter herrings at Yarmouth and Lowestoft, and the harvest of the smacks fishing out of Lowestoft and Ramsgate; and we then form some idea of how the east coast stands in respect of other coasts and the North Sea in respect of other fishing-grounds. The North Sea is the meeting-ground of fishing fleets under many flags.

It has been calculated that this country draws fish from the North Sea amounting in annual value to over £5,000,000, while Scotland takes £1,500,000, and all the other nations put together £,3,000,000.

The distinctive features of the Hull fishing are two:

the long-distance voyages to grounds as remote as Iceland and the Faroes, and the "fleeting" system of water-carriage to Billingsgate. There are two methods of bringing fish back to port. In the first each fishing-boat brings her own catch, and this, known as the "single-boating" system, is adopted by such ports as Grimsby, Lowestoft, Ramsgate, Brixham, and Plymouth. In the second the main fleet remains out on the grounds, sending the catch periodically to market by fast sailing or steam carriers. This, which is called the "fleeting" system, was formerly in favour at Yarmouth, when that port yet had a flourishing trawl industry, and is still preferred at Hull; and the three Hull fleets contribute between them the bulk of the yearly tonnage of water-borne fish credited to Billingsgate.

F. G. Aflalo.—*The Sea-Fishing Industry of England and Wales.* Edward Stanford, 1904.

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XII.—THE THAMES BASIN

The Geography of Greater London

[ONLY the briefest summary is necessary here of the geological structure of the London Basin.] The great Chalk formation, 700 feet thick, is covered by a valuable series of beds of sand, clay, and pebbly gravel, called the Lower London Tertiaries. On these lies the London Clay (200 to 300 feet thick), and on that the Bagshot Beds, chiefly fine sand. These are the latest strata of marine origin in the district, and although the bending and tilting of the strata which has finally produced the London Basin (which might better be termed the London Trough) must have begun earlier than this, it was not till a time somewhat later than that of the Bagshot Beds that the Thames which we now know near London could have begun to flow.

The northern boundary of the original Thames valley may be roughly traced by the line of hills capped by outliers of Bagshot Sand—Harrow, Hampstead, Highgate, parts of Epping Forest, Brentwood, and many others in Essex. That this line is a natural boundary seems indicated by its being at once the northern limit of unquestionable Thames gravels, and the southern limit of that distinctively Glacial formation, the Boulder Clay. Only at one place in Essex do Thames gravels and Boulder Clay come into actual contact.

. . . The original Thames was undoubtedly a much more powerful river than the present one, receiving a large amount of drainage that has now been intercepted by the

Severn and the Trent. In addition to this, some of its tributaries within the London area were also of greater volume than at present, their head-waters having been diverted, mostly into the higher tributaries of the Thames.

In these facts we find the explanation of the extensive gravel sheets that cover such large areas in and around London, and which fall roughly into two divisions: the high-level gravels (over 200 feet above sea-level), found outside the above-described boundaries of the Thames valley, and deposited for the most part by ancient tributaries ("consequent" streams); and the lower-level gravels, varying from 200 feet above sea-level downwards often (but not always) in well-marked terraces and definitely related to the Thames itself or its still existing tributaries. These are covered in many places with a layer of brick-earth, representing the fine silt deposited in times of flood over gravel-flats that the river had abandoned in its ordinary flow. This brick-earth must have once been much wider spread than now, in view of the prodigious quantity of bricks that have been made from it during the last two centuries at least; but it is still the main local source of bricks.

The Lower Thames has partially regained the greater volume it had lost by becoming a tidal river. The tidal flow has been of great importance in the historical development of London. Geographically, its effects can be seen by a glance at the map. From about Kingston downwards the river sweeps in wide curves of about half a mile radius: above Kingston we see the innumerable wriggles of a feeble, meandering stream. The region of change from one form to another corresponds exactly to the limit of tidal action before the construction of the lock at Teddington.

Of course, the present banks of the Tidal Thames are entirely artificial, the embankments dating from various periods (beginning doubtfully with the Roman) down to the present day. But artificial embanking only kept the high-water flow within the low-water channel: it did not make new channels, so that the curves are of natural origin. Partly by this artificial embanking, and partly by natural flood deposits raising the level, a large area of marshland has been added to the land during historic times.

The alluvium of this marshland is the latest of the natural deposits of the London Basin.

A. M. DAVIES.—*Geographical Teacher*, January, 1902.*
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London: its Growth and Importance

Before endeavouring to explain how London has come to be so great, it may be well to refresh our memory regarding the city. London is located on both sides of the Thames River, near the head of the tidal portion of that stream, about 60 miles from the open sea. In the heart of the great area is the historic old "City of London," only a little more than a square mile in extent. The Administrative County of London comprises the central part of the London district, the area of the County of London including 117 square miles. The county is, however, not all of London. The Metropolitan and City of London Police Districts include an area of 700 square miles, and this is what is usually called Greater London. Beyond the Metropolitan area, which extends from Woolwich on the east to Kew on the west, lie numerous suburban towns which would rank as cities if located elsewhere than on the rim of London. The population of the old "City" or Corporation in the heart of London, while increasingly large by day, is only 26,000 at night; in the county 4½ million people reside; while there are about 7 million people within Metropolitan or Greater London.

London occupies parts of four counties: Essex and

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* The early settlement of London is ably discussed in the same article.

Middlesex on the north of the Thames, and Surrey and Kent on the south. The County of Middlesex contains more of the city than is included in any of the three other counties.

The primary factor affecting the growth of any city is its site. London's *situs* was a fortunate one in the centre of the Thames basin, a relatively fertile section originally covered with forests. For 1000 years after the beginning of London there were large forest areas in Middlesex and Kent. The lower levels of the Thames valley are surrounded by ridges of chalk, the North Downs bounding the basin on the south, the Marlborough and Chiltern Hills on the west and north-west.

Originally swamps or marshes, submerged at high tide, rimmed the banks of the tidal portions of the Thames and the Lea, its principal affluent from the north. Land having an elevation of less than 50 feet stretched along both banks of these rivers, one notable exception being found on the north bank of the Thames west of the Lea. At this place the higher ground lay close to the river for some distance, and formed the site upon which the city originated. For some distance back from the river the elevation was less than 100 feet. Comparatively little of Greater London of to-day is built on ground over 200 feet above the sea. Consequently London, like Philadelphia, could readily expand indefinitely. . . .

Another influence affecting the growth of a city is the kind of country in which it is located, and its relation to that country. The metropolis of a country like Norway would inevitably differ in size and character from the chief city of Great Britain. Norway's mountains and inclement climate preclude extensive agriculture, and her limited supply of coal and iron prevents large manufacturing industry. Great Britain, on the contrary, is agriculturally productive, and until 100 years ago was an exporter of wheat. When her population became so dense that there was no surplus food, the rich deposits of coal and iron enabled an increasing percentage of the people to devote their energies to the development of manufactures. There has always been the economic basis for industry and trade, and consequently there has always been a commercial emporium.

London has always been the trade centre of England. It was made such in the Roman days by the system of highways built by the Romans, who constructed roads radiating in all directions from London. London is now even more the focus of the transportation system of the United Kingdom. Practically all the great railway-lines have their main terminus in London. London's location on the Thames also makes it a favourite centre of the enormous coasting trade of the United Kingdom.

The other great factors controlling the progress of a city are its relations to foreign countries and the international policy of its home country. England slopes towards the south and east; its mountains are in the west and north; it faces Europe, and its largest river, the Thames, is opposite the mouth of the Rhine and the Elbe, the two streams which drain the most important industrial regions of Europe. London on the deep tidal Thames is admirably situated for engaging extensively in the trade of Western and Central Europe. The location of the city goes far to explain why London has come to control the larger part of the European trade of the United Kingdom and of the British Empire, and even the trade of the U.S.A. with Europe.

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The chief factor in the growth of London is its manufactures. We seldom think of London as the great manufacturing city of the world, but the number of manufacturing plants in the area is legion. The industries are of great magnitude and variety The manufactures are localized to a large extent, and London is an aggregation of industrial centres. The army of 400,000 people engaged in making clothing is somewhat scattered, but is to be found chiefly in East London; the 50,000 people employed in making furniture reside mainly in the north-east section; the metal-workers prefer the north-central district; the potteries, glassworks, breweries, tanneries, and wool warehouses, are in Southwark and Lambeth, south of the Thames. And so one might go through London's endless list of industries and localize them in different parts of the great urban area. These industries are waxing, not waning, and their natural progress will carry London steadily forward, provided the commercial and shipping conditions continue favourable.

London still leads the cities of the world in the value of its foreign trade and in the tonnage of its shipping. Its commerce has outgrown the facilities of the port, and many millions sterling must be spent at an early date in modernizing the harbour and shipping accommodations: but that will be done. The Parliamentary and Municipal Governments are now working out a plan. The industrial progress of the United Kingdom and the British Empire, the growing commerce of Great Britain with its colonies, with Europe, America, and the Orient, will certainly cause London's trade to expand decade by decade.

The growth of London is due not only to the progress of its own industry and trade, but also to the expansion of the business of other cities. London is a great brokerage and office or administrative centre for a vast amount of commerce handled through other cities. For example, the firms that import rubber and wool have their main offices in London, although the rubber and wool are handled mainly at other ports. Likewise, many freight forwarders operate from their London offices scores of vessels that seldom or never visit that city. Three-fifths of the shipping of the entire world is British, and London is the chief centre of the ownership and management of that vast tonnage. The business of marine insurance is so localized in London as to enable that city to control most of the marine insurance business of the entire world. The progress of other countries will naturally decrease Great Britain's and London's percentage of the total shipping and marine insurance; but there is no reason to think London's advance will suffer because of the development of business in other places.

PROFESSOR EMORY R. JOHNSON.—"An American Study of London: An Essay in Human Geography," *Geographical Teacher*, Summer, 1907.

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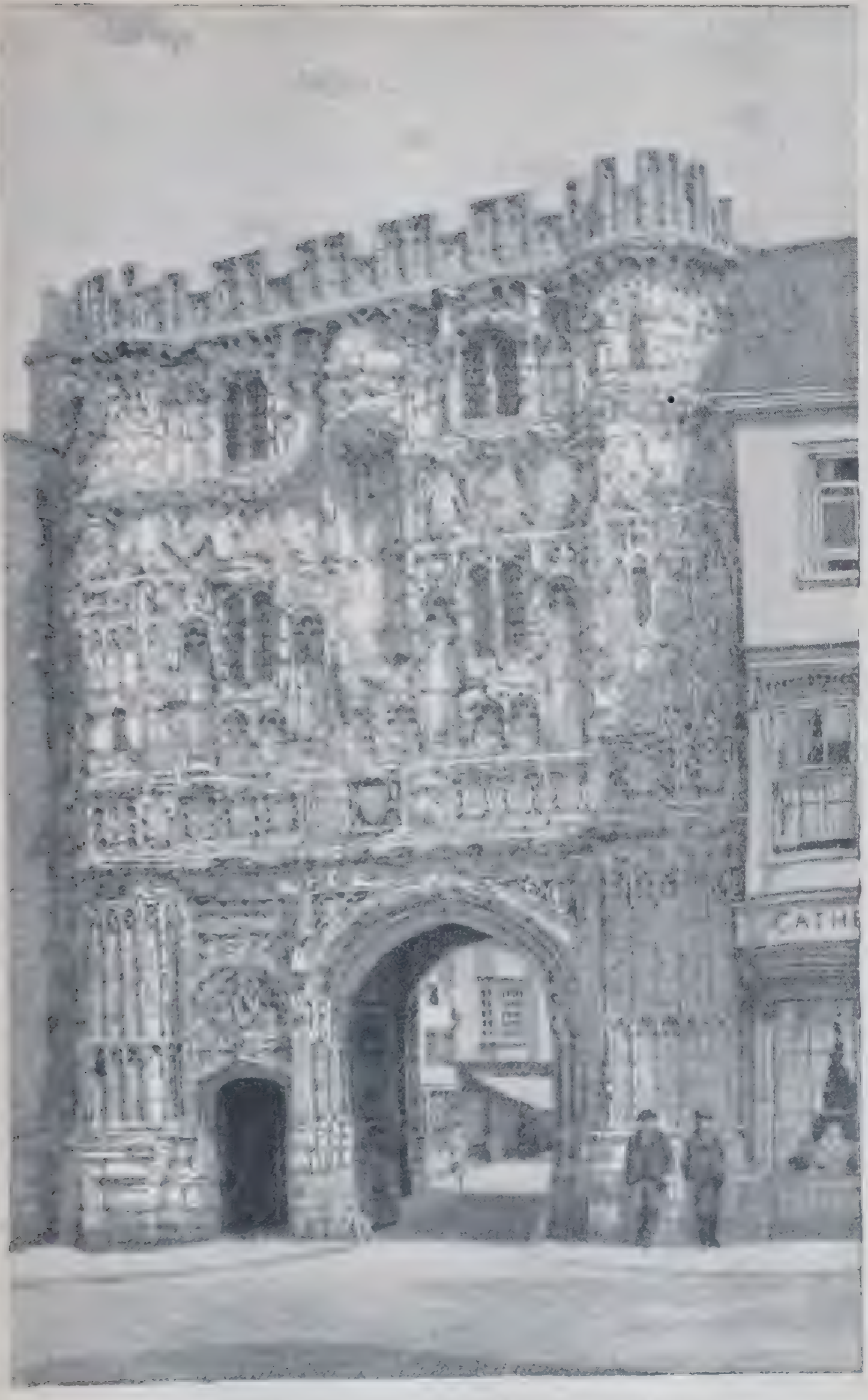
XIII.—SOUTH ENGLAND AND THE SOUTH SCARPLANDS

The County of Kent

The right of Kent to rank as a county is quite as clear as that of Sussex. Indeed, in some respects Kent has almost a higher claim. By common tradition it is the oldest Teutonic settlement in England. It consists not merely of an old kingdom, but of two old kingdoms united into one; and it contains the chief metropolitan see of all England—Canterbury. It differs from Sussex in one respect, however—that it is not so naturally demarcated in its physical features, so that its position is rather historical and artificial than essentially dependent upon its very form. Kent (like its sister county) consists of a rudely central chalk mass, the North Downs, a spur of the main lump which makes up Salisbury Plain, with a slope to seaward on one side and a dip into the Weald valley on the other.

But the seaward slope descends to the estuary of the Thames, and this, with the fan-shaped expansion of the chalk from Margate to Dover, makes up the greater part of the historical shire. The wild forest track from Tunbridge Wells to Cranbrook and the Dungeness marshes, forming the old *mark* against Sussex, has never been thickly peopled, nor entered largely into the life of the county. Indeed, the very name of Kent is the Celtic *Caint*, the lowlands, and refers originally only to the open stretch of land along the river from Sheppey to London. The submerged bank off Sheerness is still known to sailors as the Cant. This



CHRISTCHURCH GATE, CANTERBURY CATHEDRAL.

Notice the weathering of the stone. The gateway dates back to 1517, and is an example of richly ornamented Perpendicular work riverside belt alone was the district of the old Cantii, whose name now survives in that of the first Teutonic shire in England.

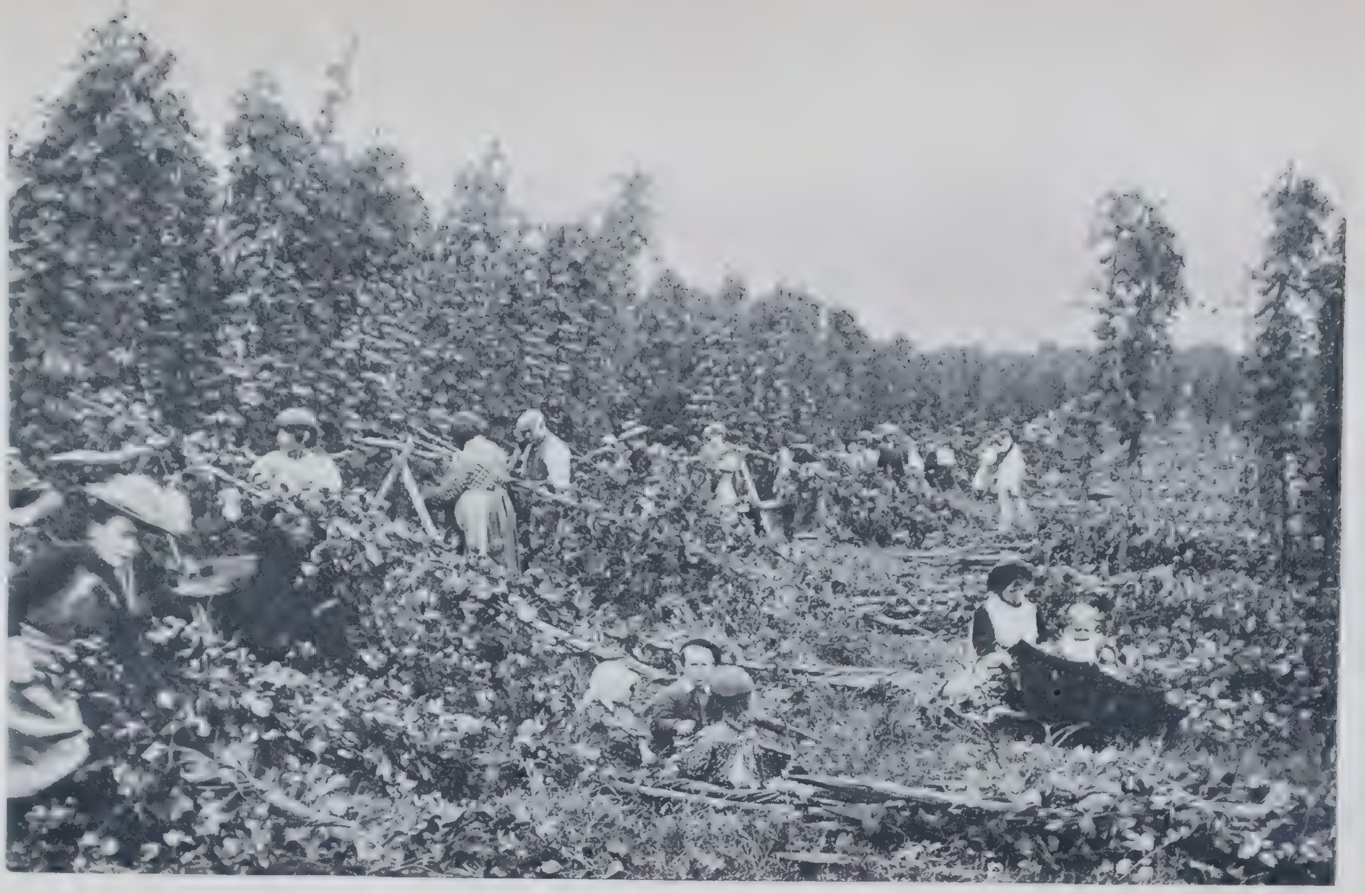
In the extreme east of the county the high chalk mass, which culminates in the North Foreland, is cut off from the rest of the range by the dip of Minster Level, through which the Stour runs lazily in an obstructed channel to the sea. But in older times the Level was a broad arm of the estuary, known as the Wansum, cutting off the Isle of Thanet (which the celts called Ruim) from the mainland. In spots like these the northern pirates always loved to land, and we know that long after, during the Danish invasions, the "heathen men first sat over winter on Thanet," and then on Sheppey. Hence there is nothing improbable in the legend which makes the very mythical Hengist and Horsa land on this island, near Ruim's-gate, the passage or opening through the cliffs into Ruim, at the place which we latter-day English call Ramsgate.

GRANT ALLEN.—*County and Town in England.*
By permission of Mr. Grant Richards.

"The Garden of England"

Its situation in the south-eastern corner of England, at the point nearest to the Continent, has made Kent a place of great historical importance from earliest times, while its position, bounded on two sides by the sea, on one by the river Thames, has given it a larger share than most other counties of the advantages which the whole country gains from its insular position. Then, too, the 1624 square miles of its area include great tracks of the Chalk Downs and of the Greensand hills, broad stretches of the fruitful Weald, rich pasturage, wide sea and river marshes. . . .

The river marshes in the north and the Romney Marshes can scarcely be cited for their healthfulness, yet of the greater part of the county it may be said that health and wealth are reconciled together, though the height of the



T. A. Flemons.

HOP-PICKING IN KENT.

chalky Downs suggests more of health than of wealth. The rich meadows of the valley of the Medway, the stretching orchards surrounding houses and farmsteads, the extensive fruit gardens in the part of the county nearer London, the many thousands of acres of swaying hops, all point to the wealth of the county—its very nickname of the "Garden of England" suggests something of the same kind. It looks a rich country as viewed from any of the numerous heights along the "Backbone of Kent," as the southern Chalk Downs are named, along the northern Downs of Chalk and Greensand, or any of the other elevations by which the whole country is marked; for there is but little level country, with the exception of the flats along the river Thames, the marshes about the estuary of the Stour, and the levels recaptured from the sea in the south.

WALTER JERROLD.—*Highways and Byways in Kent*, p. 11. Macmillan and Co.

By permission of Messrs. Macmillan.

Dover

The South Foreland lighthouses should be visited not only by those interested in those twinkling points of fire by which the seaman steers his course, but by all who would appreciate the more extended view which is to be had from them, with the endless procession of shipping passing to and from the Channel. The Foreland cliffs are nearly 400 feet above the shore, so that the lights are seen at a great distance—nearly 30 miles, it is said. The grand cliff footpath walk, which may be followed all the way to Dover, is far preferable to the road. The shore route is not to be recommended unless to those who like a spice of danger, for it can only be taken at low water, and the precipitous cliffs offer no footing to anyone who should be caught by the tide. About the chalk cliffs here may be seen any number of gulls and guillemots, and occasionally rare sea-birds are noted in the neighbourhood.

To the traveller journeying to or from the Continent, Dover is but a place for changing from train to steamer, or steamer to train, and it will not even be that if the projectors of the new "ferry" have their way, for then railway carriages will run straight on board—it will be but a pausing place while changing from land travel to seafaring. It was Dover that was the port of connection with Gaul before the coming of the Romans, and it was at Dover that Cæsar would have landed if the Britons had permitted. In those distant days the sea penetrated some distance inland along the small valley of the stream, the Dour, from which the town takes its name; but now the creek has got silted up, what level ground there is being utilized for building houses and docks. Now the town is protected by the great naval harbour works still in construction. Beyond Sandwich we might have seen the huge concrete blocks made for these works, each single block the size of the railway-truck on which it was borne; as many miles west of Dover may be observed the gathering of the shingle used for the same purpose. The great stretch of the harbour needs to be looked at from above for the proper appreciation of the magnitude of the undertaking—from either the Castle Hill or from the western heights towards Shakespeare's Cliff. From any of these bold eminences, too, we have a fine view of the town, and a glimpse of the French coast opposite.

WALTER JERROLD.—*Highways and Byways in Kent.* Macmillan and Co.

By permission of Messrs. Macmillan.

Romney Marsh

The flat tract of land stretching from Sandgate on the east to the Sussex border on the west, and practically converted into an island by the 30-mile-long military canal which begins by the former place and joins the Rother a little more than 2 miles to the north-east of Rye, is a place of peculiar fascination. Of the narrowest, between Sandgate and Hythe, this tract broadens out to nearly a dozen miles at its widest, and is nearly half as long again at its longest. Commonly spoken of as Romney Marsh, it is really divided up under various names—Romney Marsh, Walland Marsh, and Denge Marsh—and on it will be found some interesting towns and villages, many old parish churches, some with but very few parishioners, and on it, also, the well-known point of Dungeness. To most people visiting Dungeness for the first time unprepared there is a surprise in store: knowing, or knowing by repute, the chalk headlands of the North and South Forelands, Shakespeare's Cliff, and Beachy Head, they mostly regard the cape that comes between the two last named as being of a similar nature. They find instead a spit of shingle beach running out into the sea, and growing, they are told, at the rate of a yard or so every year—flat loose shingle sparsely grown with foot-high shrubs, spotted in June with golden dabs of flowering broom and singularly spired over with beautiful foxgloves. The Ness lies nearly 4 miles from Lydd, the most southerly town of the county, and is best approached by the railway which runs from that town past Lloyd's Signalling Station to the near neighbourhood of the massy Dungeness Lighthouse, 20 miles from the cross-Channel light on Cap Grisnez.

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Where Old and New Romney stand, a couple of miles apart, once ran the river Rother, which now reaches the sea to the south of Rye, finishing its course wholly through Sussex instead of through Kent. Its mouth was so silted up at the close of the eleventh century that New Romney was established nearer the sea. The change in the Rother's course is said to have followed a great storm in the time of Edward I., the road from Romney to Appledore, known as the Rhee Wall, marking the ancient course. Romney, or Old Romney, was at one time an important seaport, with a goodly harbour, the resort of much shipping; but first came the silting up of the Rother estuary, and then the deflecting of the river's course to the west, and the old Cinque Port fell from its proud position. It appears to have been a notable place for storms, too, for Thomas à Becket, when seeking to escape secretly out of England, set sail from this port, and could not get away owing to the great storm raging, and (saith Lambarde) "both the town of Rumney and the Marsh received great harme in the 8th year of the reign of King Edward the third by an hydeous tempest, that threw down many Steeples and Trees, and above 300 Mills and Housings here." Now the small place sleeping quietly inland on the Marsh suggests nothing of its important past.

WALTER JERROLD.—*Highways and Byways in Kent.* Macmillan and Co.

By permission of Messrs. Macmillan.

Sussex: its Natural Features

The whole county is determined by the great line of chalk hills, which stand steep up against the Weald—that is, with their escarpment facing northward—and which slope gradually towards the sea-plain upon the south in such a fashion that a section taken anywhere in that range resembles in form a wave driven forward by the south-west wind, and just about to break over the Weald. It is not the least of the unities which render Sussex so harmonious that this main range of the South Downs, which are the strong framework of the whole county, should have all the appearance of being blown forward into its shape by those Atlantic gales which also determine the configuration of the trees in the sea-plain and upon the slopes of the hills.

Were this range of the South Downs to run parallel to the sea throughout the length of the county, the topographical scheme of which we are speaking could be set forth in very few words. The whole county would fall at once, and without qualification, into four long parallel belts: the sea-plain, the Downs next inland to it, the belt of old villages at the foot of the Downs to the north (that is, the southern edge of the Weald), and the forest ridge to the north of the whole. As a fact, however, these lines, though parallel to one another, are not strictly parallel to the sea-coast; they tilt somewhat from the north-west to the south-east, so that the plan of the country resembles a piece of stuff woven in four broad bands, which have been cut in bias, or, as the phrase goes, "on the cross." Each belt has, therefore, its termination on the sea. The coastal plain gets narrower and narrower, and comes to an end at Brighton; the Chalk Downs run into the sea just beyond this point, and are cut off in sharp white cliffs all along Seaford Bay, in a face of white precipice, which culminates at Beachy Head. The southern and the flats, which run all across the county just north of the Downs, come to the sea in that great even stretch between Eastbourne and Hastings, for which the general name is Pevensey Level; and, finally, the somewhat complicated and diversified forest ridge, with its mixture of clay and sand, runs into the sea in the neighbourhood of Hastings.

These four great belts may be traced, not only in the relief of the county, but also in its superficial geology. The sea-plain is throughout of a strong, brown, loamy soil, among the most fertile in England, and fetching by far the highest rents paid anywhere in the county. In the best of its stretch between Chichester and Worthing it is from 4 to 6 miles broad, closely inhabited, and, though recently marred by the growth of a whole string of watering-places, still preserving a very characteristic life of its own. Except Chichester, no town of any antiquity stands upon it; but it nourishes a great number of prosperous agricultural villages, the size and architecture of whose churches are sufficient to prove their economic condition in the past.

Among the most characteristic of these is Yappington, which is supposed to be the "tun" or hamlet of "Eappa," a comrade of St. Wilfrid's, the missionary and the first

Chester Vaughan, Acton.

SOUTH DOWNS FROM BEACHY HEAD.

Bishop of the county. Lyminster is another excellent example of what these places were in the past, and its great church is the more striking from the decay of the parish around it.

The forest ridge (to take the farther boundary first) has, though somewhat confused, a geological characteristic of its own, for it consists of sand rising from and mixed with the clay of the Weald. This clay, in its turn, lying between the forest ridge and the Downs, though diversified by occasional outcrops of sand, is fairly uniform. From the beginning it has been covered, not very thickly, but very generally, with those short, strong oaks which have furnished the timber for all the old buildings of the county.

. . . This belt of clay, interspersed with occasional heights of sand, and lying between the forest ridge and the Downs, is the broadest of the four: it is rarely less than 10 miles in width, and often as much as 15.

Hilaire Belloc.—*Sussex.* A. and C. Black.

By permission of Messrs. A. and C. Black.

The County of Sussex

Of all the English counties, Sussex is the most typical and the most natural, perhaps. Its physical features mark it out as a distinct and separate whole, and its history shows it as always an independent kingdom, or a well-demarcated shire, preserving its selfsame essential boundaries throughout its entire existence. A great spur of chalk, forming the range of the South Downs, diverges from the main boss of Salisbury Plain, near the western limits of the county, and runs through it like a backbone, till it topples over at last into the sea at the sheer precipices of Beachy Head. Between the Downs and the coast a narrow line of lowland fringes the shore, a mere sloping belt between the foot of the main range and the sea, ending at Brighton; and this belt, small as it is, comprises the whole of the real historical Sussex: a long line or pro cession of seaport villages and open meadows or cornfields, jammed in between the ever narrowing Downs and the ever encroaching waters of the Channel. On their northern side, again, the Downs descend by a steep escarpment into the wide open valley of the Weald, familiar to most people in the broad view from the summit of the Devil's Dyke. Between the North and South Downs the chalk, which once covered the valley, has been worn away by denudation, and the interval is occupied by the soft, muddy, Weald clay, and the harder beds of Hastings sand. This wide tract of two Wealden formations extends along the whole northern edge of the county from the Downs to the boundaries of Kent and Surrey, and from Petersfield in Hants, until it slides under the sea at Pevensey, Hastings, and the Romney Marshes. For many ages the whole of the Sussex Weald was untilled and uncleared, a great stretch of forest known to the Romans as the Silva Anderida, and to the early English as the Andredesweald.

Its cold clay can support little more than trees, and even in our own day it is scantily cultivated. In earlier times, however, the belt of forest which grew above it was dense and trackless, and it formed a complete barrier to intercourse with all other parts of the country, sweeping round in a great crescent, as it did, from the marshy region about Chichester and Hayling, along the whole northern face of the South Downs, till it met the sea again at Rye and Winchelsea. It is this isolation of Sussex by the Weald and the marshes which makes its history so peculiar and yet so typical.

GRANT ALLEN.—*County and Town in England.*

By permission of Mr. Grant Richards.

The Slopes and Valleys of the Downs

The principal hill ranges of South England—the Chilterns, the Cotswolds, the Mendips, the North and South Downs, the Dorset Downs, and the Berkshire Downs—roughly converge upon Salisbury Plain. Of the importance of that site in the history of our island there is no need to speak here, but it is necessary to remember the disposition of the ranges in order to appreciate how great a rôle the South Downs must have played in the early history of Britain, for they furnished, as did the other three great chalk ranges (the Dorset Downs, the North Downs, and the Chilterns, with their continuation in the Berkshire Downs), the main routes of travel in early times. They were bare of trees, dry, and fairly even on their summits, and, save in a few places, they afforded a good view on either side, so that the traveller could in primitive times beware of the approach of enemies.

The great mass of chalk which forms the Hampshire Highland splits, before the eastern boundary of that county is reached, into two branches. The northern one of these runs through Surrey, straight to the Medway in Kent, crosses that river, and turns down to meet the sea at Dover. The southern branch enters the county of Sussex just beyond Petersfield, and thence eastward forms this range of the South Downs.

There is no other stretch of hills precisely like them in Europe; their nearest counterpart is that other northern range, formed much upon the same model and of the same material, which looks at them from 30 miles away across the Weald. They run in one straight wall for 60 miles, maintaining throughout that length a similar conformation, with a similar escarpment, turned perpetually towards the north; a similar absence of water; a similar presence from place to place of beech-trees, which occasionally crown their highest summits; a similar succession of comparatively low passes; and a similar, though rarer, series of what the people of the county call "gaps," that is, gorges, or rather rounded clefts, in which their continuity is completely broken by the passage of a river. . . .

. . . Their contours depend, of course, upon the chalk of which they are built. This lies in regular layers 500, 600, and even 800 feet deep from their summits to the level of the plain beneath them. It is weathered into rounded shapes, that have no peaks and no precipices, or at least no precipices save those which man has deliberately created, where he has dug straight out of their sides for chalk, or where they meet the sea, and are washed into perpendicular cliffs. They have never been built upon. The depth to which wells have to be sunk before water can be found is so great as to check experiment of this kind. There is in the whole skyline, from Petersfield right to Beachy Head, not a single human habitation to break the noble aspect of these hills against the sky.

Cultivation is also very rare upon them. They are covered with a short, dense, and very sweet turf, suited to the famous flocks of sheep which browse upon them, and of little value for any agricultural purpose than the pasturage thus afforded.

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We have seen that the unison of the Downs is broken by a certain number of regular gaps—the valleys, that is, of the Wealden rivers. For the rivers of Sussex, by an accident which geologists have attempted to explain, are not determined by the rise of these great hills, but, on the contrary, cut right through them from the Weald to the sea. The Arun, from the Wealden town of Pulborough to its seaport of Littlehampton ; the little Adur, from various sources round by Shipley and Cuckfield to its harbour town of Shoreham ; the Ouse, from the Wealden town of Uckfield to its harbour town of Newhaven, all cut right through the chalk hills, and form narrow level valleys of alluvial soil between one section of the Downs and the next.

The valleys of the Downs differ very much, according to whether they are upon the south or upon the north of the range. Those to the south are valleys of erosion, shallow, broad, and funnel shaped, with their wide mouths opening to the sea and the south west wind. They are usually called "stenes"—a word which is sometimes spelt "steine"

—the best known of which hollows is the valley running through Brighton. There are any number between that point and Goodwood. In their lower parts they support farm-houses, and occasionally they carry one of the great roads which cross the Downs from the north. They are wind-swept, and hold the snow very late: but in summer they are among the most sheltered corners of South England.

Upon the north the steep escarpment of the hills forbids any such conformation. Here the valleys take the shape of very steep hollows of a horseshoe outline, known as "Combes," a Celtic word, and frequently hung with deep woods, which are known both here and in Kent (and in other parts of the south country) as "hangars."

Hilaire Belloc.—*Sussex*. A. and C. Black.
By permission of Messrs. A. and C. Black.

The Beauty of the Downs

The Chalk cliffs protect our shores, and have given a name to our island. The Chalk Downs occupy the heart of England. Being, as a rule, higher than the surrounding country, the air is cool and pure, crisp and sweet; being generally in grass, they are silent and peaceful, giving a delightful sensation of solitude and repose, heightened rather than interfered with by the occasional tinkle of a sheep-bell or the cry of a plover.

The Downs present a series of beautifully smooth, swelling curves, perhaps the most perfect specimens of graceful contour, and are covered with short, sweet, close turf. Turf is peculiarly English, and no turf is more delightful than that of our Downs. It feels so springy under our feet that walking on it seems scarcely an exertion one could almost fancy that the Downs themselves were still rising even higher into the air.

The herbage of the Downs is close rather than short—

hillocks of sweet thyme, tufts of golden potentilla, of milkwort, blue, pink and white, of sweet grass and harebells; the curiously named "squinancy wort," with its small but fragrant blossoms; here and there pink with heather, or golden with furze or broom; while over all is the fresh air and sunshine, sweet scents, and the hum of bees. And if the Downs seem full of life and sunshine, their broad shoulders are types of kindly strength, so that they give an impression of power and antiquity; while every now and then we come across some great line of earthworks, a tumulus, or a group of great grey stones, the burial-place of some ancient hero, or a sacred temple of our pagan forefathers. Amongst them Avebury and Stonehenge are preeminent.

Stonehenge stands in solitary grandeur on Salisbury Plain, a mysterious monument of ancient times. A still greater and more ancient, but, alas! less complete, monument is that of Avebury, near Marlborough—a circular levelled area of 30 acres, surrounded by a vallum 20 feet high, containing two great circles, now unfortunately all but destroyed, from which proceeds a long stone avenue, of which, however, but little is now left. About a mile off is Silbury Hill, a gigantic tumulus of chalk, about 125 feet high, covering 5½ acres, and the greatest burial-mound in Europe.

The Wolds differ greatly from the Downs, though the chalk in the two cases is almost identical in composition. The Downs, however, are loamy; the Wolds, on the contrary, sandy, and the sand is mainly quartz, not flint. Hence, while the Downs are clothed with short, sweet turf, the Wolds grow naturally only wiry grass, gorse, and moss. The result has been that, while the Downs have been to a great extent left as natural pasture, the Wolds are of very little value unless they are manured and cultivated.

LORD AVEBURY.—*Scenery of England.* Macmillan and Co.

By permission of Messrs. Macmillan.

An English Landscape

I should like now to transport the reader to a wholly different scene, that we may consider together some of the more obvious features in the landscapes of the south coast of England. At the western end of the Isle of Wight a long ridge of Chalk Down, which stretches completely across the island, runs out to sea, and terminates in the well-known white pinnacles of the Needles. From the highest part of the ridge, when the air is clear, the eye ranges southward over a vast expanse of open sea. To the west and north the breadth of water is bounded by the blue hills of Dorsetshire, the white cliffs of Swanage Bay, and then the long, low, brown heights, which are crowned with the spires of Bournemouth and Christchurch. Eastward we note how the ridge on which we stand sinks down into the hollow of Freshwater Gap, but rises again on the farther side, and then, striking inland for some miles, sweeps round to form the heights of St. Catherine's, nearly 800 feet high, whence it descends once more in white cliffs to the sea.

On a summer noon, when a fresh westerly breeze roughens the sea into deepest azure, and keeps a continual murmur of plashing waves at the foot of the cliffs, few pieces of English coast scenery offer more attractions than this.

Let me suppose that we are placed upon the extreme western verge of the Down, with the Needles in front of us. The chalk that forms these white faces of rock is shown by science to be made up entirely of the mouldered remains of creatures that gathered on the sea-bottom ages before the species of animals living at the present day came into existence. Sponges, crinoids, corals, shells, fishes, reptiles, mingled their remains with those of the minuter forms of life that accumulated on the floor of that ancient ocean. And now, hardened into stone, the ooze of that sea bed has been upraised into land. The "long backs of the bushless Downs," which for many successive centuries have remained as we see them, were originally parts of the sea-bed, and are entirely built up of the vestiges of dead organisms.

But this is not all. Look at one of those noble faces of rock which shoot up from the restless breakers, and take note of the parallel lines of dark flints, which, as if traced with a pencil, sweep in such graceful curves from base to crest of the cliffs. Alike on buttress and recess, from headland to headland, no matter how irregularly the chalk has been sculptured, these parallel lines may be followed. A feature so conspicuous in the architecture of the precipices could not escape the attention of the most casual visitor, but he only vaguely marvels at it, until geology tells him that these dark lines mark successive floors of that ancient sea—floors that gathered one over another, as generation after generation of marine creatures left their crumbling remains upon the bottom. But now they are bent up, and placed on end like books on the shelves of a library; and thus we learn that not only has this ancient sea-bed been turned into dry land, but its layers of hardened ooze have been tilted up vertically, and that it is the worn ends of these upturned layers which form the long ridges of the Downs.

But science further makes known to us that beyond the cliffy margin on which we stand there once stretched an ampler land that has long disappeared. Far over the English Channel the Chalk Downs once extended, with their undulating summits, their smooth grassy slopes, their deep combs and quiet bournes. That vanished land ran southward until it ended off in a range of white precipices. The rain that fell on its surface gathered into a river that flowed northward through Freshwater Gap into the Solent. Strange to tell, perched on the top of the present cliffs to the east of Freshwater lie fragments of the bed of that ancient stream, consisting of gravel and silt, which, as the cliffs are undermined by the waves, tumble to the beach and mingle with the gravel of to-day. In these ancient deposits are found teeth of the long-extinct mammoths which browsed the herbage on slopes that rose southward, where for many a long year the Atlantic has rolled its restless tides and breakers.

Musing on these records of a dim forgotten past, we once more turn to the last spurs of chalk and the isolated Needles. There, with eye quickened to realize what science has to reveal, we trace on every feature of the rocky foreground, inscribed in characters that cannot be mistaken, the story of that process of destruction which has reduced the Isle of Wight to its present diminished proportions. The rains, frosts, and tempests splinter the chalk above, and the waves gnaw it away below. Year by year fresh slices are cut off, and strewn in fragments over the sea-floor by the unwearying surge. The Needles, once part of the Downs, are perceptibly less than they were a generation ago. The opposite white cliffs and Downs of Dorset were at one time continuous with those of the Isle of Wight. They, too, by their shattered precipices, tunnelled caverns, and isolated stacks of rock, tell the same tale of disintegration. And thus, impressive though the scenery was before, it now acquires a new interest and significance, when every cliff and pinnacle becomes eloquent to us of a past so strange, so remote, and yet so closely linked with our own day by a chain of slow and unbroken causation.

SIR A. GEIKIE.—*Landscape and Imagination.* Macmillan and Co., 1905.

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The New Forest

This rich geological variety, providing chalk, clay, and sandy soils, having very distinctive mineral composition and physical properties, would in itself be sufficient to furnish the natural conditions for wide differences in the flora generally, and in the natural distribution of the woodland trees in particular. The influence of these primary petrological factors is, however, greatly increased on account of the differences in configuration by which they are accompanied. Thus while the chalk lands consist in the main of uplands, and elevated, breezy, wind-swept Downs, the clays, sands, and gravels of the two younger formations have more the character of the lower undulating country, of sandy moors and of low-lying, often water-logged, gravelly tracts, with peat-bogs, water-springs, and swamp-like ponds; while the older beds of the Cretaceous system yield good sands, clays, and loams, separated by the steep hillsides of the Upper Greensand, known locally as "hangars," and familiar by name to all admirers of Gilbert White.

The Chalk Downs, the highlands of Hampshire, occupy from about one-third to two-fifths of the county. Consisting now of smooth rolling Downs and undulating tracts, wooded here and there, but otherwise bare, bleak-looking, and devoted to rough pasturage, they were probably at one time thickly wooded, though there are now only the scattered remnants of these primeval woods. Elevated considerably above sea-level, mostly bare, easily permeable to rain-water, and of immense depth, these higher chalk tracts have an essentially dry climate. Heavy downpours of rain rapidly disappear without even forming springs in the combs or bends in the hillsides, although the water reappears in the shape of springs and streams in the Lower Chalk of the gently undulating land near the Greensand.

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It is not difficult to form an idea of the primeval woodlands of Hampshire. It is more than probable that the whole county was originally densely wooded, and that these Chalk Downs, as well as the Cotswolds, the Chilterns, and all the hills of similar character forming the backbone of the southern counties of England, were mainly covered with beech-woods, of which those still existing in patches varying in size are but the poor scattered remnants. When the earliest settlers, at first nomadic and afterwards permanent, fixed their abodes near the watercourses, they probably subsisted mainly on wild fruits and roots, and then went through the hunter stage of development before attaining higher evolution. It is not improbable that swine formed their first, and for long their only, possessions in the way of domestic animals, just as is now the case among the Karens and similar hill-tribes in the vast forests in Burma The herds of swine could be taken out into the woods to feed on beechmast, and by wallowing and breaking up the ground with their snouts, either in pursuit of mice or in wantonness after having eaten their fill, would be of very real service in securing the natural regeneration of the woods by means of seed.

With the introduction of fire and the improvement of primitive implements, efforts would be made (as can still be observed in many densely wooded, uncivilized parts of the world) to destroy a sufficient portion of the woodlands to permit of primitive agriculture. The chalk soil, deep, fissured, extremely permeable to water, and easily becoming heated through exposure to the sun, would soon lose its virgin fertility and become deteriorated, when fresh clearances would have to be made for agricultural purposes. And so the clearances would gradually extend till the only woodland tracts remaining would be those actually necessary for the maintenance of the large herds of swine.

J. Nisbet and the Hon. Gerald W. Lascelles.—"Hampshire," *Victoria County Histories.*

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XIV.—SOUTH-WEST ENGLAND AND THE CHANNEL ISLANDS

Dorset Downs and Valleys

THE estuarine and fluviatile character of the beds composing the Frome and Stour valleys has made those districts, all through history, less agriculturally important than the vale of Blackmoor, which, since the early eighteenth century, has been a great barley-raising district. But just along the alluvial districts which border the Frome and Piddle, the land is as good as in the vale of Blackmoor. The difference between the two lowland districts persists to the present day: the ridge of Okeford Hill divides "underhill" from "overhill" folk. "Overhill" to the south, on the poorer land, they raise sheep; on the north barley-growing and dairying are the industries. In this connection it may be noted that the South Dorset sheep, the "smutty-faced Dorset Downs," particularly of the Watercombe stock, are remarkable, both for the excellence of their mutton, and for the amount and quality of wool they yield—a combination not generally attainable.

The Chalk Downs have been called the cradle of our race, and such they certainly were in Dorset. A walk from Wareham to Lyme along the Downs demands unwearied attention to a succession of tumuli, camps of all dates, temples, stone circles, village remains, and to vestiges, in short, of every age of prehistoric and early man. The Druidic circle at Poxwell and the "Maiden" castle on the hills west of Dorchester are easily matched by the Cerne

Giant (probably to be connected with phallic rites), the Nine Stones of Portisham, by Rawlsbury Camp; Celtic village remains and camps, such as those of Aggerdun, Powerstock, Hambledon, and Duncliff, are all on the Downs, or on their isolated outliers.

What was it that caused "our rude forefathers" to choose for their dwelling-places the barren Downs, and to leave uninhabited the pleasant valleys? In the first place, the all-important demand of early man was flint. This he found in abundance in the chalk districts, but not in the valleys. . . .

But most of all, the valleys were filled with trees, dense forest, and hence, besides being fever districts, were at that stage of culture unsuited for human habitation. It may be objected that the settlements of the early inhabitants along the hills must have been waterless. This was not the case. This primitive folk possessed, in common with some savage peoples of to-day, the art of making dew-ponds. These curious contrivances for capturing and storing water still remain in many places, and may be seen often, as at Maiden Castle, in conjunction with the remains of the habitations of their makers. Another source of water open at certain periods of the year to early man, probably in greater abundance than is now the case, was the "winterbournes"—features of the valleys and combes of chalk districts, and therefore particularly characteristic of Wiltshire and Dorset. At present there are two of these "winterbournes" which are particularly important: that of the valley south-west of Blandford, which has given a prename to the villages of Winterbourne Stickland, Winterbourne Houghton, Winterbourne Whitchurch, Winterbourne Kingston, Winterbourne Tomson, and Winterbourne Zelston; and that of the district immediately west of Dorchester, when, rising at Winterbourne Abbas, the stream passes through Winterbourne Steepleton, Winterbourne St. Martin, Winterbourne Monkton, and Winterbourne Came.

This tract of country, with forest-filled valleys and bare chalk ridges rising out of them like islands from the sea, was converted into a district habitable throughout by a process unknown to us in detail. This only we know—that whereas in these prehistoric days human habitations were practically confined to the Downs, the region which lies outside the 300 feet contour line is now that most populated.

MRS. C. E. FRIPP.—"Dorset," *Geographical Teacher*, vol. iv., part 3.
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Dorset Harbours

From Portsmouth to Weymouth peculiar tidal phenomena have, through the whole course of history, affected the development of the district. So long ago as the time of Bede ("Eccl. Hist.," Book IV., cap. xiv.) the double tide of this coast was famous. The presence of the Isle of Wight has the effect of producing four tides daily, and this effect is still further heightened in Poole Harbour by the situation of Brownsea Island. At spring tides, after high-water, the tide in Poole Harbour recedes for 2½ hours, falling about 2 feet. It then rises again 6 or 8 inches, making "second high-water" 3½ hours after the first. Then it gradually falls for nearly 3 hours to the regular low-water. At neap tides, after the first high-water, the tide does not recede, but stands at the same level for a considerable time, and then rises a foot or more, thus making the level of second high-water higher than that of the first. At Wareham Quay the times of high and low water are practically 1 hour 25 minutes after those of Brownsea coastguard station and Poole Quay; but the rise at springs at Wareham is 1½ feet less than at Poole, and at Wareham there is no rise at neaps, though at Poole there is 4¾ feet. This fact will possibly account, to some extent, for the gradual predominance of Poole over Wareham, though conditions in the Dorset harbours have changed greatly since the historical record began, and it is difficult accurately to trace the progress of these changes. Early in the sixteenth century at neaps the bar at Poole drew 2½ fathoms; now only 11 feet. The bar has, during the later half of the nineteenth century, increased to an alarming extent. In the Saxon days, and down to the end of the Angevin period, Wareham was on the sea, and not, as now, 2 miles inland. Receiving the commerce brought by the Frome and Piddle, being the natural port of export for the "Purbeck marble," of which even Westminster Abbey was built, owing much to the advantages of its double tides, protected by the earthworks within which it still nestles, and further strengthened by its own castle and by that of Corfe, Wareham was, till the thirteenth century, one of the greatest ports of England.

In Roman days Clavinium, the sea station for Dorchester, was, as we should expect, in Weymouth Bay, but slightly to the east of the present town. Weymouth and Melcombe Regis (which since 1571 have been joined in one) are both old towns, but they only rose on the ashes of Wareham. As the harbour of the latter became more and more silted up, the harbour ("the Backwater") of Weymouth increased in importance, till during the Great Rebellion it became a necessity to both parties to secure it. The building of the great breakwater at Portland has, since its completion in 1862, entirely dwarfed the older harbour, and the additions involved by the recent strengthening of Portland Roads are gradually so altering the currents in Weymouth Bay that the portion of it west of Bincleave Rocks is getting shallower every year.

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Bridport is one of the numerous class of more important ports which has failed to keep its place. Like Wareham, it is now far from the sea. From 1388 to 1619, and especially during the fifteenth century, great efforts were made to construct there a harbour which should defy the tendency to silting up. Collections were made throughout England,

and Papal dispensations were freely offered to those who should assist the good work. What has, however, kept Bridport from entire decay is its hemp manufacture. For the growth of this plant the mild dampness of its climate renders it specially suitable. Even in the early thirteenth century it furnished ropes for the navy, and in the time of Leland a "Bridport dagger" had become the slang for the gallows-rope ("Itin.," iii., 60, 61). To-day it still has its rope manufacture, and makes seines and nets of all sorts, line and twine, cables and hawsers. There is a large export of these to the United States, the West Indies, and Newfoundland, but the greater quantity is consumed in the home fisheries. Its one import by a natural correlation is cork, brought hither direct from Spain, and used for all manner of fishing gear.

MRS. C. E. FRIPP.—"Dorset," *Geographical Teacher*, vol. iv., part 3. By permission of the Editor.

The Isle of Portland

A solitary fragment of the submerged track which once occupied the entire dry bed of the English Channel still stretches in a long line due south of Weymouth to the Bill of Portland, and afterwards runs out for some distance under the sea as a submarine ridge, making for the opposite and corresponding French uplands of the Côtentin and the Cap la Hogue. Though now united to the mainland by a bold curve of accumulated shingle, the Chesil Bank, this solid bank of oolitic limestone nevertheless rightly deserves its ordinary popular name of "the Island"; for its three sides are all alike worn down into precipitous cliffs by the action of the waves; and the singular causeway which now joins its western face to the Dorsetshire coast some ten miles lower down, though itself of immemorable antiquity, does not date back by any means so far in geological time as the original isolation of the great triangular rock which forms its terminus. In other words, the modern peninsula was once a real island.

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The reason why this solitary block of solid stone has survived the whole of the neighbouring lowland is not far to seek from the geological point of view. Portland consists of an outlying mass of harder oolitic strata, which have resisted the waves of the Channel, while the softer surrounding clays and Greensands, whose relics form the cliffs and slopes of the two lateral bays, have all been gradually washed away on either side by the ceaseless action of the water.

Moreover, the Portland beds themselves are tilted up in an inclined plane, from the sea landward, so that the surface follows the natural dip of the strata; and the same beds are found at pretty nearly the same depth below the soil in all parts of the island.

Indeed, the whole of this Dorsetshire country is everywhere seamed and traversed by numerous faults, which have thrown up the rocks in adjoining places at very different angles. The southern half of Portland still retains something of its primitive appearance: a poor, bleak, barren, wind-swept plateau, destitute of tree or hedge, and divided by bare stone walls into small rectangular fields, where the black-faced sheep which become famous as Portland mutton find a scanty herbage under the shelter of these frequent artificial barriers against the omnipresent wind.

Each wall is built of thin slate-like layers of stone from the unmerchantable beds (to adopt the local language): and instead of agate it is pierced by a broad gap filled in loosely with large round boulders, which can be easily removed by the hand to let in or out the flock or the farmer's cart. Stone, in fact, forms the substratum and the whole *raison d'être* of Portland; it fulfils every function which would elsewhere be fulfilled by wood or any other possible material. The greater part of the population lives entirely by exporting the island piecemeal. The entire northern and higher half is a succession of quarries and stone-works. . . .

A large part of the island has already been shipped away to London and elsewhere. It was not till the seventeenth century that the Portland stone was brought into notice by Inigo Jones as the material for the Banqueting Hall at Whitehall, and since then it has been abundantly employed for St. Paul's Cathedral and many other well-known buildings.

GRANT ALLEN. *County and Town in England.* Grant Richards.
By permission of Messrs. Grant Richards.

A North Devon Seascape

On our right from our very feet the sea spreads out to the horizon; a single falcon was wheeling about the ledges below; a single cormorant was fishing in the breakers, diving and rising again like some tiny water-beetle:

"The murmuring surge
That on the unnumbered pebbles idly chafed
Could not be heard so high."

The only sound beside the rustle of the fern before the startled deer was the soft mysterious treble of the wind as it swept over the face of the cliff beneath us; but the cool air was confined to the hill-tops round; beneath, from within a short distance of the shore, the sea was shrouded in soft summer haze. The far Atlantic lay like an ocean of white wool, out of which the Hartland Cliffs and the highest point of Lundy just showed their black peaks. Here and there the western sun caught one white bank of mist after another, and tinged them with glowing gold; while near us long silvery zigzag tide-lines, which we could have fancied the tracks of water-fairies, wandered away under the smoky grey-brown shadows of the fog, and seemed to vanish hundreds of miles off into the void of space, so completely was all notion of size or distance destroyed by the soft gradations of the mist. Suddenly as we stood watching a breeze from the eastward dived into the basin of the bay, swept the clouds out, packed them together, rolled them over each other, and hurled them into the air miles high in one cordillera of snowy mountains, sailing slowly out into the Atlantic; and behold, instead of the chaos of mist, the whole amphitheatre of cliffs, with their gay green woods, and spots of bright red marl, and cold black ironstone, and the gleaming white sands of Braunton, and the hills of Exmoor bathed in sunshine, so near and clear we almost fancied we could see the pink heather hue upon them; and the bay one vast rainbow, ten miles of flame-colour and purple, emerald and ultramarine, flecked with a thousand spots of flying snow. No one knows what gigantic efforts of colour even our temperate zone can show, till they have been in Devonshire and Cornwall; and last, but not least, in Ireland—the Emerald Isle, in truth. No stay-at-home knows the colour of the sea till he has seen the West of England; and no one, either stay-at-home or traveller, I suspect, knows what the colour of a green field can be till he has seen it among the magic smiles and tears of an Irish summer shower in County Down.

CHARLES KINGSLEY.—*Prose Idylls.* Macmillan and Co.
By permission of Messrs. Macmillan.

The North Devon Coast and "Devonian" Rocks

Deposits of the same age as the Old Red Sandstone are found in two districts within the limits of Devonshire. The northern area extends southwards from the Bristol Channel to a line almost coincident with the railway from Taunton to Barnstaple, but generally a few hundred yards farther south. At this boundary the beds of rock disappear under a newer series, and do not reach the surface again until they rise up on both sides of Dartmoor, at Tavistock on the west and Chudleigh on the east. From these places to the English Channel by far the greater part of the country is covered by them.

In both districts the rocks have been greatly crushed and broken, so that it is comparatively seldom that we are able to find any fossils which are not more or less distorted, and in some places the original structure of the rock itself has been almost entirely destroyed by events which occurred considerably later on. In the extreme south of the county there are some crystalline metamorphic rocks, making up the district round Salcombe and the Start, which may be older, but which are just as probably of the same date as those immediately next to them.

The two series of deposits differ considerably, but the difference is not greater than we should expect to find in places whose distance from the shore of the old continent varied by a space equal to the 30 miles which lie between them.

There are no similar rocks anywhere in the British Isles except in Cornwall, which is largely covered by a continuation of the southern series, and in the hills of West Somerset, whose structure resembles that of North Devon.

Having been first studied in Devon, they received the name of Devonian rocks, and the period is therefore known all the world over as the Devonian. There is sufficient evidence to show that the Old Red Sandstone deposits were formed in lakes or land-locked basins, while the Devonian deposits were undoubtedly marine.

The best way to examine these rocks and to endeavour to interpret them is to confine attention to one of the two regions. To begin, then, with the northern exposure, we will start at Lynmouth, where the great cliffs give us magnificent sections, and the deep gorges and rock-valleys enable us to see a great deal of the inland structure. Here there is a marked difference between the red beds of the Foreland and Countisbury, and the grey and purple-grey cliffs to the west of the harbour. The red rocks can be well studied at low-water by walking along the beach, and there are several sections in the roadside cuttings on the road to Watersmeet. The resemblance to the Old Red Sandstone deposits of the Welsh basin is so strong as to strike anyone who has seen both, but the colour is not, as a rule, so deep; the grey beds are much more numerous, the texture of the rock is generally much finer, and here and there, where small bands of fossils occur, they are the remains of marine organisms.

At first sight the beds look as if they were very regularly stratified, though the strata have been greatly tilted and folded, but a closer inspection reveals the fact that in many places the planes of division which look like bedding are really the result of pressure. In making the coach-road to Watersmeet there are several places where the road had to be removed by blasting, and these sections are well worth a careful scrutiny. The rock as a whole is very barren of fossils, but here and there rather wavy lines of irregular holes are to be found in the hard sandy stone. These lines run obliquely across the planes of division. A vigorous use of a hammer will soon show that the lines of holes are really little patches of fossils. The shells themselves have disappeared, and the cavities they once occupied have been more or less filled in with a red-brown powder which crumbles at a touch. . . .

If we turn from Lynmouth and go westwards, either along the cliff paths or along the beach, we find much finer grained materials and grey grits and sandstones, which lie not much inclined from the horizontal. The grey grits are admirably shown in the Castle Rock and along the Valley of Rocks, while at the back of Lynton, in the Station Hill, there are a number of little quarries, such as one in a lane known as Mount Sinai Lane, where the beds are a very fine grained shaly material of a dirty yellowish-grey. These must have been a finer mud settling to the bottom of the sea farther from their source, and not unlike the slimy, muddy sand revealed at low-water every here and there along the modern Bristol Channel. In the grey grits of the Castle Rock marine fossils are not rare, but they cannot very easily be found. . . .

The curious castellated look of the Castle Rock and others in its vicinity is due solely to the facts that the beds lie nearly horizontal and the rock is naturally divided by cracks known as joint planes into roughly cubic blocks, and the blocks themselves vary a good deal in their power of resisting the wear and waste of time. The hills, therefore, tend to become rough piles of cubic blocks, calling to mind the idea of ruined cyclopean masonry.

A. W. CLAYDEN.—*History of Devonshire Scenery.* Chatto and Windus, 1908.

By permission of the Author.

Exmoor

The western portion of the county of Somerset consists of very broken and hilly ground, covering an area some 30 miles in length by 15 in breadth. It is bounded on the north by the Bristol Channel, on the east by the Quantock Hills, and on the south and west by Devonshire. The largest and most mountainous tract is that occupying the extreme west—the wild expanse of Exmoor. From its loftiest point, Dunkery Beacon, the whole country is spread out as on a map.

Immediately around and far to the west are the rolling steppes of Exmoor, channelled by many a deep combe, each the bed of a torrent. Along the northern slopes spread the grey waters of the channel, into which the moorland sinks with great abruptness. From here the grand escarpment is not visible; it is, indeed, only properly seen from the sea, and no one who has sailed along these seaward hills will ever forget that magnificent coast-line. Right out of the "foam-laced margin" tower the great Downs, here wooded nearly to their summits—11, 12, 13 hundred feet above; there, bold and bare, the wind-shorn turf, sprinkled with stony screes or sparsely shaded by storm-bowed oak, and, with the single exception of the break caused by Porlock Bay, the rampart continues from the huge foreland of Countisbury to Minehead.

But it is not all moor. Between Dunkery and Porlock are the deep-wooded glens of the Horner and its tributaries, while the vale dividing its steeps from the North Hill—as the short range running from Bossington to Minehead is called—is fertile and smiling, 4 miles across, and dotted with hamlet and homestead. . . .

. . . Not only is Dunkery the highest part of Exmoor, but Exmoor is head and shoulders above the hills adjacent. A wild open moorland it is, little cultivated, bleak, and lonely. The central part is dreary enough: no tor, as upon Dartmoor, breaks its sombre lines; no tree, save in some sheltered combe, softens its stern aspect. But on its borders will be found some of the finest scenery in England—dark, narrow valleys, crowded thickly with trees, lit by the white flash of an impetuous torrent, dashing headlong over mossy boulders, at one time caressing, at the next submerging, the thickets of fern that fringe its course.

As little of commercial value can be made out of Exmoor, there are neither towns nor villages really upon it. At one time there were mines; but they have long ceased working—a fact that no lover of scenery will deplore. Not even chemical works or powder mills—those common accessories of waste land—disfigure the landscape. The villages—small, old-world, picturesque—stand at irregular distances about the skirts of the moor, as if dreading its cold blasts and chilling mists.

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Yet in spite of its barrenness it is not without beauty—a grim beauty, perchance, and of a kind that in the heart of the moor may, to some folk, become monotonous, but that still has its attractions. The great round hills, and dark, sullen ridges, in their very grandeur of desolation, cannot fail to speak in tones very moving to him who loves the moorland. The wild heath beneath, the wild sky up above—far up, but which seems at times so near—inspire a feeling of freedom to which the dweller in the lowlands is a stranger.

And then the view. It may be questioned whether any highlands in England command the immensely varied prospect obtainable from this cradle of the Exe and Barle. Nearly the whole of the county of Somerset, quite half of Devon, a slice of Dorset, even a bit of Cornwall, lie beneath the eye; an expanse of salt water, from Avonmouth to Lundy, and far beyond into the wild Atlantic, stretches away right and left, while northwards the view is but blocked by the lofty mountains of Central Wales—a panorama which is without equal south of the Scottish Border.

Of its history little can be said. Of course it was a British fastness—the beacons on Dunkery and other hills, and the barrows which here and there break the long line of heath, speak to us of an early people; but it seems to have been but sparsely inhabited, certainly not to the extent of its distant sister, Dartmoor.

There are few, if any, hut circles, and none of those enclosures of "standing stones" that render so interesting the wild tract between Tavy and Teign. Roman coins have been found near Exe Head, not very far from the reputed camp of Showlsborough Castle; though what the conquerors of the world wanted in so desolate a spot is not apparent. Perhaps they utilized the old British trackway, which is said to have run from the Parret over the Quantocks and Brendons and up the Exe valley to Barnstaple. Perhaps they "prospected"—as was certainly the case upon the Brendon Hills—for minerals.

J. Ll. W. Page.—*An Exploration of Exmoor.* Seeley and Co., 1895.

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Devonshire Rivers

The birthplace of Tamar, most important of Devonshire rivers, is in a rushy knoll in the dull moorland country beyond Holsworthy. Close to it rises the Torridge, which, taking the northern slope of the watershed, follows a circuitous course to Appledore. Both rise within 4 miles of the sea; yet Tamar has to travel 59 miles before it reaches Plymouth Sound, and the Torridge a distance quite as long to the waters of Bideford Bay. And yet the source of this latter river is, as the crow flies, but some 15 miles from its mouth! Commencing, then, towards the rising sun, first comes Axe, then Otter, then Exe, with its tributary the Culm. Below the Exe the Dartmoor streams descend to the sea—the Teign, the Dart, the Avon, the Erme, the Yealm, the Plym, the Tavy, and its tributary, the Walkham. Last of the rivers flowing southward is the Tamar, forming the boundary-line between Devon and Cornwall. Of streams taking a northerly course there are three: the Torridge, discharging itself into Bideford Bay, where it is met by the Taw from Dartmoor, and last the rushing torrent of the Lym. Thirteen in all have direct communication with the sea. Three at least have fair-sized tributaries, without counting smaller streams, which would swell the number very considerably.

With such a variety of scenery as Devon affords, with such a geological formation, these rivers must of necessity differ widely, not only as to their surroundings, but even as to their colour. As long as they are on the heights they are all crystal clear, but when their race has run a few miles down the valley, some of them lose their transparency. This doubtless is due to a great extent to the towns and villages that have arisen on their banks; but I doubt whether streams flowing through such alluvial soil as do the Tamar, the Exe, and the Culm, were ever quite as pellucid as those bubbling down the granite, and flowing over a more or less stony bed all the way to the head of the estuary.

Thus, these three large rivers—that is, large as West Country rivers go—though clear as glass compared with their slow-moving brethren farther east—the muddy Parret, and, if possible, muddier Avon, for instance—have not the sparkle or gleam of the moorland torrent, any more than they have their noisy manners. And yet not a single Devon river is really sluggish. The country is against it. Even the mild Exe is swift, while the Tamar is only slow-moving between Weir Head and its estuary. And not one is uninteresting. Where you have not mountain, you have wooded hill; where ferny combe is not, the rich valley is emerald with greenest grass and stately with some of the finest elms in England.

Tamar is the most important stream; but this is not so much because there is a waterway for coasters as far as Calstock, but because its lower course, the estuary called Hamoaze, is a station for the navy, while the great dockyards of Devonport and Keyham lie along the waterside. Next to it comes the Dart, navigable (of course, on the flowing tide only) to Totnes, a distance of 12 miles.

"Dartmouth Haven," the beautiful pool inside the narrow opening, where the river meets the sea, has long been a port of the Cape steamers. It is also a station for the training of naval cadets, and a great rendezvous of the yachting fraternity. The Taw and the Torridge, too, admit vessels to the ports of Bideford and Barnstaple respectively, and ships can get a mile or so up the Exe before they must enter the canal for Exeter; for the estuary of the longest river in Devon has for many years been as unfit for the manœuvres of any but the smallest craft as that of its neighbour the Teign, on which, above Shaldon Bridge, you will see nothing but fishing boats, or a clumsy barge blundering up on the tide as far as Newton. Thus it will be seen that the rivers of Devon are not, as far as navigation is concerned, of great commercial value. Yet even the most headlong do not lead useless lives. Many a mill is turned by the torrent, or by "leats" drawn therefrom; many a factory owes its existence to their presence; they drive the machinery of more than one mine.

J. Ll. W. Page.—*The Rivers of Devon.* Seeley and Co., 1893.
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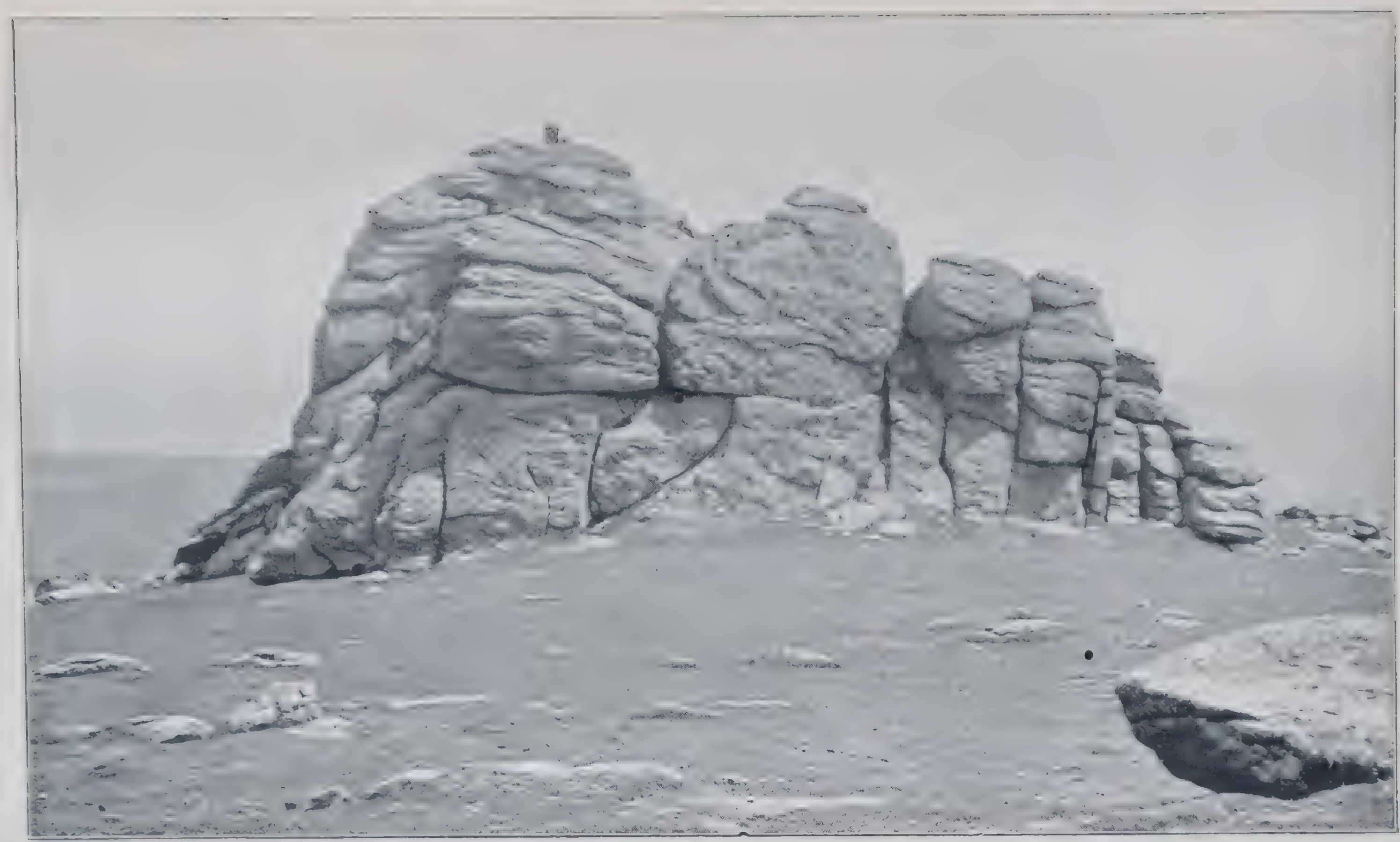
Dartmoor

Southward across the Culm country we come to Dartmoor, and again the scenery changes. The granite is surrounded by a ring of basement Culm and Devonian rocks, which have been more or less baked and hardened by the heat from the molten mass. This altered Culm produces a margin not unlike Exmoor. On the west there is the splendid valley of the Tavy, on the north and east the gorges of the Teign. Further south are the similar scenes of Bickleigh Vale and Holne Chase.

In these valleys, carved out of hard rock, some of the work can be seen to be effected by what is known as pot hole action. A shallow hollow is formed on the bed of the stream, or a few large boulders happen to lodge so as to produce a swirling movement. If now some stone is swept into the cup small enough to be swept round and round, but too large to be easily carried away, it slowly abrades the rock, forming a rounded basin, which is gradually deepened. Two neighbouring pot-holes enlarge until they join; then the division clears away, and in time the process begins again.

Lydford Gorge has been almost entirely made by this process. The narrowest and most sombre part of the gorge shows innumerable smooth rounded sections of such holes, some of which are far better than any diagram. The stream falls and rushes along the bottom of a chasm from 70 to 80 feet deep, and in places not more than 15 feet wide. Truly an awe-inspiring place if visited when the



Photochrom Co., Ltd.

HEY TOR, DARTMOOR.

snow is thawing quickly on the moor, or after some days of heavy rain, when the swollen waters fill the great crevasse with a thunderous roar, and the black walls are dripping wet with a mist of spray. Lower down the valley opens out, but narrows again where it nears a patch of volcanic rock, and then gradually opens wider and wider as the rocks become more distant from the granite.

The granite area of the moor itself is bleak and bare. It contains none of the deep-wooded vales such as abound among the northern heights, and the summits of its hills are often crowned by rugged piles of native rock called tors.

The sandstones of Exmoor, the grits of the Culm, and, indeed, most rocks when exposed to the weather or to water which has percolated through the soil, break up into small pieces, which are soon rounded into pebbles. With granite this is the exception, and not the general rule. Again, granite does not yield to abrasion much more easily than sandstone, but when exposed to the weather it has nothing like the same power of resistance. The contrast is well seen in the ruins of Okehampton Castle. The weather of some centuries has beaten on these old walls, and blocks of granite in them are deeply corroded, so that they can be crumbled away, and bits can be rubbed out of them with the fingers; but other stones of red sand from Hatherleigh seem quite unchanged, and still show the marks of the mason's chisel.

Soft rocks, like the unaltered Culm or Devonian shales, are very easily removed, either by flowing water or by exposure to the weather. But if such beds are intermixed with grit and sandstone, the coarser debris these produce is not easily removed by the weather; it requires the action of running water. If sufficient water-power is available, the hard fragments make hard pebbles, which are exactly the tools for digging away the river bed. Thus in a Culm or Devonian country the rivers abrade their beds rapidly, but the valleys do not open wide. The coarse fragments of the harder beds must lie on steep slopes before they can be moved.

If the shales also are hardened by heat, they resist the weather almost as well as the grit, but both yield hard pebbles, and the result is deep valleys with precipitous sides, like Fingle Gorge upon the Teign, or, in an extreme case, the narrow fissure made by the Lyd.

The peculiar properties of granite, whereby the undecomposed stone is hard and well able to resist abrasion, but the stone itself is somewhat easily rotted by the weather, results, as a rule, in shallow, wide-open valleys, with comparatively gentle slopes. . . .

The barrenness of the Moor is due partly to the bleak winds of winter, but also to a large extent to the nature of its soil. The decomposition of the rock resulting in a mixture of sand and clay, the subsoil is too frequently water-logged, and the surface consists of peaty bogs. Properly tilled and drained, even the higher parts may be brought under cultivation. The average surface of the Moor is high above the surrounding country, because its general rate of waste is less than that of even the hardened Culm and Devonian rocks. This seems at first sight almost a contradiction to what has been said of the rate at which granite rots; it is not really so. The rate at which a country is planed away depends far more on the speed with which its rivers can dig their channels deeper. The streams on the granite deepen their channels very slowly, and the surrounding rocks may rot, but the materials cannot get away; on the other hand, in a district which yields abundant débris of the right size, the valleys deepen quickly, and when any of the intervening rock does give way to the action of the weather, it is soon removed and a fresh surface exposed. The granite, as a whole, then forms a projecting highland, and its edge is thus frequently trenched by the streams where they rush down to the lower ground, but these valleys suddenly narrow when the granite is left.

The greater heights are on the northern or western edge, and a broad hollow extends from the line of the Bovey Basin to Chagford. . . .

It must not be forgotten that the Moor has been a land surface ever since its superincumbent volcanic peaks first arose above the waters of the Devonian Sea. Those peaks must have mapped out a drainage system among themselves while they were still active volcanoes, and such a drainage system must on the whole have persisted long after they had become extinct. The valley bottoms dug deeper and deeper into the mass of lavas and tuffs and possible Culm rocks, until some of them reached the granite. . . . Many thousands of feet of basalt must be piled on the surface of modern Dartmoor if we would restore it to what it was when the great flood of lava rushed from some vanished cone to pour down past Posbury, Pocombe, Exeter, and Poltimore.

Still one more type of scenery is found in Southern Devon, from Newton Abbot to Plymouth. It is a smoothed and softened copy of the north, but varied by the irregular distribution and variety of its component rocks. Limestones and volcanic bosses diversify the landscape, causing the slopes to change abruptly and irregularly. The deep valleys are varied by bold bluffs and gently sweeping curves, while they are continued seaward by long branching fjords. These are no sea-wrought inlets, but only drowned portions of the valleys, and the beds of the streams which made them now lie buried far beneath the mud which paves the present channels. The broad alluvial plains, which in recent times have filled up the estuaries of the Exe and Axe, are made of gravels lodged in broaded valleys which were similarly submerged, and the process is still going on. We know that in Roman times, and later, the estuary of the Axe was an important harbour; and, indeed, it was in use so recently that the harbour quay is still in good repair.

Such minor changes, however, have made little alteration in the whole, but are enough to show that the making of scenery is still progressing. The same agents of erosion and reconstruction are busy as of old, and it is by watching them at work that we can learn how they have worked before. A new factor has been added to the great physical forces of Nature in the restless energy and enterprise of man. Men hew the forests, drain the marshes, dam the rivers, and obstruct the waves. But great as is the effort they can produce upon the landscape, all their efforts do little more than modify the surface. They cannot yet control the floods, nor stay the storm. Volcanoes and earthquakes still exist, but we have no means of knowing whether the greater earth movements might or might not still occur. It may be that the world has reached a stable state, that its framework has attained its final condition like the bones of a full-grown man; but it is equally likely that the vanished continents may again arise, and new mountain chains grow from the ocean floor.

However this may be, many of the processes which have made our country what it is are still at work, changing and modelling anew its ancient frame. But some traces of its present form must always be, for it is just as true of the making of scenery as it is of human history or of human character—that the past has made the present, and the present shapes the future.*

A. W. CLAYDEN.—*History of Devonshire Scenery.* Chatto and Windus, 1908.

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Start Point

The uncanny-looking Start has impressed itself upon the imaginations of most of those who have seen it.

The name of the headland is the Anglo-Saxon "Steort," which itself means simply a point or tail, as seen in the name of the Redstart or "Redtail": but to the fanciful these cruel rocks—the scene of so many fearful wrecks—seem not unlike the sacrificial altars of some blood-stained superstitious cult.

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* Graphic descriptions of Dartmoor tors and bogs will be found in *A Book of Dartmoor*, by Rev. S. Baring-Gould, and published by Messrs. Methuen.

The Start projects far out to sea, a dark mass of gneiss rock with quartz veins. It is in the uncomfortable shape of a razor-backed ridge, with demoniacal-looking humps, spires, and spines of iron-hard rock, ranging from prominences like the vertebræ of a crocodile's back to sharp points in the likeness of hedge-stakes.

It behoves the stranger to be careful how he comes to his exploration, for this, ∧, is the section of the Start. Sloping sides of short slippery grass at an alarming angle descend dangerously to the sea from the serrated skyline, and a false step will send you rolling down to those rocks that have proved fatal to full many a shipwrecked mariner.

It is some sixty years since the lighthouse at the extremity of the point was built. The lantern of it is 200 feet above the sea, and shows two lights, lit every evening, ten minutes before sunset: a revolving beam once every minute for vessels out in the Channel, and a constant fixed gleam for shore-going boats, to warn them off the Skerries bank.

But for all these safeguards, the Start remains a fatal point. When a "snorter" from the south west or a fog sends vessels out of their course upon the coast, they are doomed.

C. G. HARPER.—*The South Devon Coast.* Chapman and Hall. 1907.

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The Plymouth Hoe

The greatest point of vantage in all Plymouth is the great open space beside the citadel. It is the Hoe. What the Rialto was to Venice, what the Hard to Portsmouth, the Sandhill to Newcastle-on-Tyne, the Broomielaw to

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PLYMOUTH FROM MOUNT EDGCUMBE, SHOWING DRAKE'S ISLAND.

Glasgow, that was the Hoe to Plymouth of old. From it let us never forget on a memorable day of 1588 the "Invincible" Armada was sighted—that proud fleet which was to conquer England, and place the foot of Spain upon our necks. . . .

. . . The improving hand of modern times has indeed improved away much of the outward and visible romance of the Hoe, which from the rugged cliff-top common of Elizabeth's time, whence the great captains roused from their historic game of bowls first glimpsed the dreaded Armada, has been flattened out into trim lawns, and provided with broad gravel promenade paths, like the veriest urban park or recreation ground. But this historic spot can never be quite spoiled so long as it continues to look out upon Plymouth Sound, and nothing less than a cataclysm of Nature can alter that outlook. Consider how exceptional the site: 150 feet above the sea, it looks straight out to the Channel, 3 miles away, with the many square miles of glorious Plymouth Sound in between, enclosed to right and left by the wooded heights of Mount Edgeumbe, and the terraced hills of Mount Batten and Bovisand.

Off the Hoe, in the most commanding position, disputing if need were the entrance to Mill Bay, the Catwater, and the Hamoaze, is the great crag now known as Drake's Island. It is a kind of islanded Gibraltar, a nest of forts and batteries of a calibre not generally known, but reputed immensely strong. Drake's Island is not accessible to the public, and like all mysteries is looked upon with awe.

That was a worthy and noble idea by which Smeaton's old lighthouse-tower, superseded from its watch and ward over the Eddystone, was rebuilt on the Hoe in 1882. From the gallery of it you may catch a glimpse of its successor, diminished by the distance of 14 miles to the semblance of a tiny stalk rising lonely amidst the waste of waters. It was no reflection upon the stability of the tower that it was found necessary to remove it, after it had safely weathered the storms of 120 years in that exposed situation. It was the reef on which it stood that had decayed. The interior of this wave-washed tower, come ashore again after so many years, is open to inspection, and there round the cornice of what was the store-room, you read the expression of the piety of those who built in the text, "Except the Lord build the house, they labour in vain that build it," while above the lantern is the further inscription, "24th August, 1759, Laus Deo."

C. G. Harper.—*The South Devon Coast.* Chapman and Hall, 1907

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The Cornish Coast

While the surface of the country is covered by a mantle of vegetation, save where granite tors protrude their wild and fantastic eminences, and the rocky wastes break the continuity of the fertile pastures of the lower lands, the coast forms a line of cliffs steep and bare which almost girds the country. This dissected line affords us a series of sections of the great rocky platform which forms the mainland of Cornwall, and which otherwise is so much concealed by the materials of its own decay as to be largely beyond the limits of our observation. That great platform, stretching seawards and presenting to the Atlantic solid ramparts of lofty cliff, appears to withstand the constant assaults of the sea without sustaining any damage; but in spite of the obduracy of these bold headlands we know, from the effect of wave action on softer strata, that though imperceptibly they must be slowly losing ground. It has been calculated that a single roller of the Atlantic ground swell (20 feet high) falls with a pressure of about 1 ton on every square foot; but the winter breakers often exert a pressure of over 3 tons to the square foot, so that the cumulative momentum that our coast is called upon to withstand is indeed enormous. If the projecting headlands reveal small traces of the ravages made upon them by the sea, the bays notwithstanding their more sheltered situation readily betray their losses. While the former plunge steeply beneath the water, the softer rocks which form the bays are lined by a succession of beaches, from the platforms of which we can study the effects of wave action. It is evident from the most cursory examination of the cliff-foot that our seaboard is undergoing a slow but constant modification. The débris from the cliff which accumulates at its base is shifted by tide action, and in times of storm is hurled by the sea against the rock face from which it was detached. While this process rounds the fragments and finally reduces them to the condition of gravel and sand, the cliff itself is gradually being undermined by the incessant pounding, and furnishes a further supply of débris, which, in its turn brought within the action of the waves, occasions a repetition of the process, and the sand and shingle so produced are still further assorted and spread on the sea floor by the action of tide and current. Not only is the cliff eroded along its base, but blocks of rock are frequently detached by the loosening of their joints, due to the disintegrating action of the weather, such as rain and frost.

This débris, if permitted to remain, would act as a shield against the continued waste of the cliff; but the moment it comes within range of the waves, it is utilized as an instrument of further destruction. That the gradual fretting back of our shores is a fact to be reckoned with is apparent to dwellers on the coast. During the last quarter of a century within the experience of the author the footpaths skirting the shores of Gerran's Bay have been gradually removed inland by the landslips along the edge of the cliffs, consequent on the undermining of its base; and at the present time rents are still visible along the edge, the certain precursors of future landslips, while large slices of the cliff are still to be seen which have not yet subsided to its base. . . .

The mutual relation of our bays and headlands to the character of the rock formations is nowhere better expressed than in the termination of the great headlands which enclose Mounts Bay. The Bay is hollowed out of a district mainly composed of slate, while the great promontories by which it is flanked are built up of hard igneous rock—that of the Land's End being composed of a boss of granite, the outer limits of which approximately conform to the coast-line; while that of the Lizard, which constitutes the opposite spur, consists of igneous rocks the dominant member of which is serpentine. The relation of these hard and tough rocks to the softer slates is expressed not only in the configuration of cape and inlet, but the elevation of the cliffs shows similar correspondence, the cliffs of Mounts Bay being dwarfed by the more imposing mural faces of the Land's End and Lizard promontories. The granite of the Land's End presenting a vertical wall to the Atlantic forms the most impressive scenery, while the serpentine, which enters so largely into the geology of the Lizard, breaks up into the most picturesque coast, the charm of which is enhanced by the natural polish induced by the action of the waves on that singularly beautiful rock.

J. B. Hill, F.G.S.—"Cornwall," *Victoria County Histories*, vol. i.

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Cornish Granite

Cornish granite, generally speaking, is much coarser in texture than that found in other parts of the British Isles, and granite having this peculiar formation has the advantage of being found in larger and more regular masses or beds than the finer-grained granite of these islands. The composition of Cornish granite also allowed of its being cheaply worked by masons into the various shaped stones required for large public works, and so in consequence a new industry for Cornwall rapidly sprang up, and till within a few years ago all engineering works of any magnitude on which granite was used were mainly supplied with that material from this county. Cornwall had not only supplied the granite for dock, harbour, and other engineering works in Britain, but had also supplied it for similar purposes to other parts of the world.

When the demand arose for granite blocks, the "Moormen" first used the boulders which were thickly strewn in the granite districts. They were cut up and exported in the rough or cloven state. These surface stones, however, which were in many cases partially decomposed, were not really suitable, and it was soon realized that the material must be quarried systematically and from a depth which would ensure sound rock, and further, that the stones should be worked on the spot. . . . Penryn is the centre of the Cornish quarrying industry; there are scores of quarries near here which all produce rock extensively used for engineering purposes.

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The procedure in quarrying granite is briefly as follows: A suitable position for opening a quarry having been determined on, the subsoil and loose and poor rock are removed. When this is finished, an examination of the joints is made, and the discovery of a good bed or horizontal joint determines the proper position for boring a hole to receive the explosive. The object is to dislodge a mass from its natural position with as little alteration as possible in its form, and it is therefore very important that all obstacles which might impede its free movement should be removed. Any neglect in this respect may result in the rock being shattered. . . . When the rock has been dislodged by the successful firing of the hole, the quarrymen split it up into smaller blocks to make the various-sized stones required. The splitting is accomplished by steel wedges inserted into numerous small holes drilled by hand across the various faces of the large rock, in such positions and in such lines as are determined by the experience of the quarryman. . . . It is well known that the tin industry of Cornwall has materially

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KING ARTHUR'S CASTLE, TINTAGEL.

suffered from foreign competition. It appears likely that history will repeat itself, and the granite industry of the county will suffer in the same way. Of late years the vast resources of Scandinavia have been requisitioned. Abundance of granite is found there, in such positions and under such conditions that it is already proving a very formidable rival to the Cornish stone.

J. B. Hill, F.G.S.—"Cornwall," *Victoria County Histories*, vol. i.

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Cornish Fisheries

The spring mackerel fishery, which has now become one of the great industries of England, is carried on by drift-nets exclusively, and the habits of the fish which lead them to congregate in enormous numbers off the extreme south-western coast make Newlyn in Mounts Bay the natural headquarters and the fish market. The fish appear first at the end of February or the beginning of March to the south of the Lizard, and gradually move westward, until at the end of May they are found to the south and west of the isles of Scilly.

In addition to the fish caught on the south and west, which are landed at Newlyn, a considerable quantity are taken in the mouth of the Bristol Channel, to the north-west of St. Ives, by drift-boats from that port. The season comes to an end with the month of May, when the great mass of fish disappears. In some years they come off the coast again in the autumn in sufficient quantities to enable the large boats to use their drift-nets.

There are altogether in the ports of Cornwall about 300 boats engaged in the mackerel drift net fishing, of which about 60 are east of the Lizard, 150 in Mounts Bay, and 80 at St Ives.

Mackerel appear in considerable quantities near the shore in the bays on the south coast during the summer in small schools, each of which is a number of fish from 5000 down, travelling in a crowd huddled together. They are then caught in seines made and kept for the purpose. Unlike the drift-fishery, most of the mackerel seine-fishery is to the east of the Lizard.

The pilchard* fishery, which is now second in importance to the spring mackerel fishery, is by far the oldest. In consequence of a decreasing demand for the fish by Italian markets, and an increase in the pilchard fishery off the north west coast of Spain, the export from Cornwall has diminished to a great extent in the last thirty years.

St. Ives is the chief centre of the Cornish herring fishery, and there the average annual export amounts to about 2000 tons, or perhaps 6,000,000 of fish. The fish are sent to English markets by rail.

The deep-sea trawling off the coast is carried on chiefly by the large trawlers from Plymouth and Brixham, and much fish from this source is landed at Newlyn in the spring and early summer; but many of these boats, which are much larger than those of the local fleets, carry their catches to the home ports.

J. B. CORNISH.—"Cornwall," *Victoria County Histories*, vol. i.
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The Scilly Islands

A land of flowers and storms! A land of contrasts! A land where the palm, the aloe, and the eucalyptus of sunny subtropical climates luxuriate, amid a stunted vegetation suggestive of the bleak north where life is difficult. Such is the Scilly Archipelago. A cluster of islands and rocks of granite now lying out in the Atlantic, but in a far-off past supposed to have been joined to the mainland of Cornwall, perhaps no part of Britain is so little known, and yet these so-called "Flowery Isles" possess natural beauties rarely surpassed in Europe. To many the remarkable equable climate of Scilly would be one of its principal recommendations, for frost and snow are practically unknown, and on the average there is only a variation of 10° F. between summer and winter temperatures. But climatic contrasts of a very striking nature may be experienced, nevertheless, for although these isles are doubtless influenced by the warm waters of the Gulf Stream, they are also exposed to the vagaries of the great waves of the broad Atlantic, there being over 3000 miles of ocean between the western isles of Scilly and the nearest land due westward.

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* The pilchard is a small fish of the herring family, generally about 10 inches long and less than ½ pound in weight. It is caught both in drift nets and in seines, and the methods in use to-day are the same as those which were in use 300 years ago.

The Scilly Archipelago consists of islands and rocks to the number of nearly 200, but only five are now inhabited —St. Mary's, Tresco, Bryher, St. Agnes, and St. Martin's. According to tradition, the isles of Scilly were once joined to Land's End, and stretching across the 30 miles of sea which now intervene was a great plain, upon which stood the kingdom of Lyonesse.

Then came a mighty convulsion of Nature, which submerged the whole land, with the exception of certain elevations, which are still above the water, and now form the subject of the present article. Tradition also identifies these islands with the Cassiterides of the ancient Phœnician mariners, a theory which is not at all improbable, for there appear to have been tin-workings in some places. The historic record certainly dates back to the time of the Romans, who made St. Mary's a penal station, and not many years ago both Roman pottery and coins were discovered there. The absence of any mention of the Scilly Isles in the Domesday Book would indicate that they were considered of little value, which, indeed, seems to have been almost always the case in the history of these islands. In the time of Henry VI. the whole archipelago was valued at a yearly rent of fifty puffins and six shillings and eight pence. When Richard III. caused an inquiry to be made as to their value, they were returned as worth forty shillings in time of peace, and nothing in time of war. Queen Elizabeth, however, took a different view of their worth, and deciding that they were of strategical value to England, had St. Mary's fortified, and built the Star Castle, which still stands on the summit of the Garrison Hill.

The Scillonians are a proud but courteous and hospitable race of people, who do not consider themselves Englishmen. Possibly in this view they are to some extent correct, for we are told that in early times the marauding Danes made these islands a stronghold for attacks on the Cornish coast, and the natives of St. Martin's and Bryher are supposed to still bear signs of a Norse strain in their blood.

At the present day the whole group of islands is leased from the Duchy of Cornwall by one person, who is termed the Lord Proprietor, or by the natives the Governor.

In recent years it is the flower industry that has chiefly directed attention to these islands, and also raised the islanders to a more prosperous and self-supporting position than they ever before attained. The flower harvest may be said to begin with the first day of the year, and to extend to April or May. During these months the fields of the flower farms are brilliant with the beautiful blooms of iris, jonquil, narcissus, anemone, daffodil, wallflower, marguerite, and arum lily. The air is laden with their perfume. How different is the scene in summer! The same fields are absolutely bare, but the observant visitor will notice that many of them are hedged with unusually dense fences of laurel, escallonia, veronica, euonymus, etc.; and here we have a clue to the importance of these otherwise barren-looking tracts of land, for their function is that of protecting the budding crop in due season against the biting north winds, which may come down upon the islands and do great damage to the blossoms. The demand for these spring flowers has steadily increased, and the industry is now so remunerative that almost every land Scillonian farms them. During the first quarter of the year everybody is working at high pressure, picking and packing the flowers to Covent Garden and other markets.

St. Mary's is the largest member of the archipelago, and it is here that the English tourist disembarks from one of the West Cornwall Steamship Company's comfortable steamers, after a short voyage of only about four hours under favourable conditions. The island is 9 miles in circumference, and, like the Scilly Islands in general, is not possessed of any lofty hills, for its highest peak is only a hillock of about 150 feet St. Mary's appears to have barely escaped being divided into two distinct islands, and on the narrow isthmus of sand which connects its two constituent portions Hugh Town, the metropolis of Scilly, has been developed. This is the only "town" the archipelago can boast of. St. Mary's is the seat of government, the post office, bank, etc., and, being the business centre, the off-islanders must come there for supplies, and to despatch their produce.

To the tourist an expedition across to Tresco is generally the first thing to be done. This popularity is due to the far-famed Tropical Gardens connected with Tresco Abbey, the residence of the Lord Proprietor. Plants flourish in the open air here which can only exist under glass in England, and some rare exotics have flowered in these gardens for the first time in Europe. Within the space of a few acres one finds natives of Japan, Hindostan, Australia, Tasmania, South Africa, West Indies, etc.

Professor A. Denny.—*Travel*, March, 1898.
By permission of the Author.

The Channel Islands

Off the coast of the Cotentin, to the north of the Bay of Mont St. Michel, is to be found a group of islands, surrounded by islets, rocks, and reefs. These islands are called by the English the Channel Islands; by the French, Les Iles Normandes. The group is composed of Jersey, Guernsey, Alderney, Sark, Herm, and Jethou, and a few minor rocks.

Jersey and Guernsey have each its own court and code of laws, and politically and socially their history is quite distinct. Alderney and Sark are included in the bailiwick of Guernsey. Herm and Jethou have no special administration, and are considered as detached portions of Guernsey territory.

Although the islands lie so close to one another, there is very little real intercourse between them, and it frequently happens that a resident of either of the larger islands has never visited any of the other members of the group.

Situated as they are at the gateway of England, the Channel Islands are certainly much less well known than many far more distant archipelagoes. They comprise the only territory remaining to England of the old Duchy of Normandy.

* * * * *

The commercial history of the islands may be roughly divided into five periods. The first of these was the fishing period, when the majority of the islanders were seamen, and salted and dried their congers at their seigneurs' eperqueries.* They then supplied these fish to the inhabitants of the neighbouring coasts of France and England; for in those days, when the Roman Church imposed continual fasts, fish formed the staple article of diet. The second was the knitting period, when wool was their chief import, and stockings, "guernseys," and "jerseys," their chief export. This period began at the proclamation of neutrality in the fifteenth century, and lasted till about the middle of the seventeenth century. The third was the privateering period, which was marked by great activity in shipbuilding, at high pressure, picking and packing the flowers to Covent Garden and other markets.

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* "Lieu où on suspend le poisson à des perches pour le sécher."—[illegible] Dictionnaire de l'Académie Française.

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PROFESSOR A. DENNY.—*Travel*, March, 1898.
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* "Lieu ou on suspend le poisson à des perches pour le sécher."—GODEFROI: *Dictionnaire de l' Ancienne Française.*

Alderney

The appearance of Alderney from the sea is that of a rugged mass of solid granite, covered with a flat carpet of green, and rent by giant fissures running down to the sea. It is surrounded by dangerous rocks and whirlpools, between which rushes a seething tide, and the plaintive cries of countless sea birds seem a fitting accompaniment to the dreary aspect of the grim rocks and foaming seas. The first impression on landing is that of desolation and ruin. Half of the breakwater which was erected at enormous cost in 1847 has been swept away by the sea: the houses built hard by to accommodate the army of labourers employed on these harbour works have fallen or are falling down; the little sleepy town, with its grass-grown streets, is surrounded by alleys, houses, and gates, all mouldering into decay; and in the distance the ruined walls of once powerful forts stand, although their "wind worn battlements are gone."

But when once on the beautiful southern coast, looking down on

"The murmuring surge
That on the unnumbered idle pebbles chafes,"

it is impossible not to feel that rugged, treeless Alderney has a savage, untamed beauty denied to the other islands.

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DEVIL'S HOLE, JERSEY.

the beauty of wild Nature, swept by sea-breezes, washed by brilliant foaming waves, and surrounded by

> "Cliffs and downs and headlands which the forward-hasting
> Flight of dawn and eve empurples and embrowns."

* * * * *

The island of Alderney has always been treated as the "ugly sister" of the Channel Island group; her history has been neglected and her beauty ignored, although latterly her strategic importance has been realized, and since the days when Bonaparte called her "le bouclier d'Angleterre," she has been generally acknowledged to be the key of the Channel.

The island may physically be divided into two distinct halves, the north and east consisting of low sandy commons, and the south and west of huge granite cliffs, fertile uplands, and green valleys.

E. F. CAREY.—*The Channel Islands* (illustrated). Messrs. A. and C. Black, 1904.

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Sark

The old legends of enchanted islands which appeared at one time almost within reach, and at another far away on the horizon, are irresistibly recalled as one gazes at Sark from Guernsey. On some days it is so clear-cut against the sky that every undulation is visible; on others, so shrouded in dim mists that it seems long miles away.

At first sight it looks almost inaccessible, for its rock-bound shores—where on every peak and headland gorse blazes golden against the sky—rise sheer 300 feet above the sea. Not until half the circuit of the island has been made does the little harbour, with its modern pier and breakwater, come into sight. In former days only the sloping beach at Le Creux and the little artificially hewn tunnel gave access to this "small sweet world of wave encompassed wonder."[*]

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[*] The memory still survives of the occasion when the Lords of the Admiralty, wishing to land and inspect the defences of Sark before

Sark is by far the loveliest and least spoilt of the islands—a tableland surrounded and upheld by wide beetling cliffs, and intersected by cool, green country roads, leading to thatched granite farm-houses. This verdant plateau slopes everywhere into wooded valleys, which in spring-time are so thick with primroses or with wild hyacinths that the ground seems flooded with pale golden light, or is blue as if with "the heavens uprising through the earth"; and these glades end abruptly in some rocky precipice, which, right down to the water's edge, is fringed with ferns, heather, and ivy, or set with clusters of sea campion, fragile and white as the spray itself. At the foot of these cliffs the coast is in many places broken up into caves, which are almost as much a feast of colour as the land above, filled as they are with the dark pools and purple rocks covered with countless seaweeds, and containing such an infinite variety of sea-anemones that they are—

> "From the crown of the culminant arch to the floor of the lakelet abloom,
> One infinite blossom of blossoms innumerable aflush through the gloom."

Great Sark is connected with Little Sark by "one sheer thread of narrowing precipice," called the Coupée. Far below the sea thunders and roars; it is the wildest, weirdest spot in the Channel Islands. Especially is its grandeur enhanced when the surroundings are obscured by drifting masses of rain-cloud or wreaths of fog, when the sea murmurs invisible beneath, and the really great depth seems illimitable, and standing on the narrow causeway one seems to have wandered somehow into space, and to be surrounded by nothing but the elementary forces of Nature.

E. F. Carey.—*The Channel Islands* (illustrated). Messrs. A. and C. Black, 1904.

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the harbour was built, sailed round and round the island vainly seeking for a landing-place, and finally sailed away, declaring that it was inaccessible.

ACC. No 5244
CLASS No.
Date 24-11-86

XV.—IRELAND

Irish Woodlands

THE area of wood in Ireland was, in 1907, 306,661 acres, or 1·5 per cent. of the total area of the country. In England the percentage of land under woods is 5·3 per cent.; in Scotland, 4·6; and in Wales, 3·9 per cent. The comparison with Continental countries is more striking. In Austria 32 per cent. of the area of the country is under woods: in Hungary, 27 per cent.; in France, 17 per cent.: in Belgium, 17 per cent.; in Germany, 26 per cent.: in Holland, 8 per cent.

Denmark has over 7 per cent. of the land under woods. She is an agricultural country, less than half the size of Ireland, and her acreage under woods is double that of Ireland. Iceland is the only country in Europe whose proportion of woodland falls below that of Ireland.

Such as it is this area is steadily shrinking. The total area under woods is being reduced, and from the character of the cutting, the quality of the woods left standing is being deteriorated.

One of the most serious aspects of the present state of things is the menace it constitutes to existing Irish wood-working industries which are dependent upon the supply of home-grown timber.

There are some particular considerations affecting this problem at the present time which have given the question of a native timber supply a greater importance and urgency than before. The world's supply of timber is decreasing.

or rather the demand for timber is outstripping the pace at which it can be met. This is due to the increase of population and to the general development of industries, including processes of manufacture, such as the manufacture of paper from wood-pulp, by which timber is largely consumed. The United States, whose manufacturing industry has expanded enormously within the last twenty years, is consuming her timber at such a rate, and destroying her forests so wastefully, that Government is taking alarm. Canada's supply is also in danger, and is likely in future to be heavily encroached on by the United States. About a third of the supply of timber coming into the United Kingdom, or nearly £7,000,000 worth annually, comes from these countries. As these facts—the increase of the home as well as the foreign demand, and the excessive encroachment on their sources of supply—affect without exception all the timber-exporting countries who are supplying the British market, it follows that the value of timber as a national asset must increase.

All the men of experience and expert knowledge are agreed that in soil and climate Ireland for forestry purposes is particularly well favoured, and that she can grow, and has grown, some of the finest timber in Europe. Her humid air and mild and equable temperature—conditions which she derives from her geographical and physical situation—are the conditions most desirable for tree-growth.

* * * * *

The mountain land of Ireland for the most part consists either of land covered with wet peat, land with a surface of bare rock, or land with little or no peat, and usually with a surface of gravelly soil.

The peaty and rocky types of land predominate in the north and west of the country, and in the main are more or less unsuitable for forestry purposes. The hills of Antrim, the Sperrin mountains in Londonderry, the Donegal highlands, the mountain ranges of Mayo, Galway, Leitrim, Sligo, all possess large areas of peaty land, interspersed with masses of bare rock, constituting waste land in the fullest sense of the term. But there is also some of the land having gravelly soil with little or no peat in these countries, and on this forestry is possible to some extent.

The mountain land in the counties of Clare and Kerry and South-West Cork is fairly equably made up of all the types, and a third of the whole may be regarded as plantable. In the counties of Waterford, Tipperary, Carlow, Wexford, Wicklow, and parts of Cork, the mountain land generally belongs to the more favourable type; peat is confined to the higher elevations, and the surface is more uniformly covered with timber-growing soil. In all these counties the possibilities of afforestation are great, and probably from 10 per cent. to 20 per cent. of the entire surface of the mountains might be profitably utilized in growing timber.

In general it would seem that the suitability of mountain land for planting purposes decreases as the western coastline is approached—a fact partly due to the greater deposits of peat in that direction, and partly to the influence of the westerly winds—whereas mountain land in the east and south of Ireland is, taken as a whole, suitable for afforestation.

How much land in the country, then, seems to be available for forestry purposes? Two classes of land must be barred out in forming an estimate:

1. Land which would pay better for tillage or pasture.
2. Land which from its exposed position or its altitude, or the character of the ground, would not grow trees successfully at all—viz., genuine waste land.

The land resulting from this elimination furnishes the area available for forestry. This area is found among the mountains, as above indicated, and also on land which is not mountain land. In the latter case it consists mostly of land which is covered with heather, gorse, bracken, and other growth, which destroy the greater part of its

Great Western Railway.

FISHGUARD HARBOUR, LOOKING ACROSS TO THE IRISH COAST.

grazing value and render it of little service to the owners or occupiers.

From the Report of the Departmental Committee on Irish Forestry, 1908.

Irish Migratory Labour

On the evidence obtained from various sources it may be estimated that approximately 25,000 migratory labourers went to England and Scotland during the past season. Of these over 20,000 went to England, while about 4500 went to Scotland, some of whom, however, would find their way during the season into Northumberland. Only a small number of the class of migratory labourers under consideration found employment in Ireland.

With regard to the change in the number of temporary migratory labourers who annually go to work in England and Scotland, the evidence from various sources shows a falling off of over 2000 in the year 1905 as compared with the year 1904. Of recent years the number has been slowly decreasing. Since 1880 an annual enumeration has been made of migratory labour. As far back as the records go, County Mayo has been the principal source. From none of the other counties of Connaught is the movement so widespread or so strongly marked. A very considerable number, however, come from Roscommon. Ulster is the only other province from which there is any large movement of harvest migratory labourers, and of these over 80 per cent. are Donegal men.

From no counties in Leinster and Munster is there any considerable movement of harvest labourers to England or Scotland.

The migratory labourers form three groups:

1. The Achill workers, both male and female, employed by potato merchants and farmers in Scotland.

2. The Donegal men, who go to Scotland and Northumberland as emergency workers and harvesters.

3. The Connaught men, who go to England—chiefly to Cheshire, Lancashire, Durham, Yorkshire, and the shires of Lincoln, Cambridge, Huntingdon, Warwick, and Stafford.

1. As regards the Achill workers, whose number is estimated at between 1500 and 1600, the season begins in the middle of June and closes in November. Although known in Scotland as Achill workers, many come from other places on the west coast, especially Belmullet, and a smaller number from Aranmore, and the islands in Donegal. Men and women alike take part in the work, the women forming, if anything, the larger number. The men who come are in most cases old men or lads of from sixteen to twenty-one years of age. At the beginning of the season nearly all are employed in Ayrshire. The usual rate of wages is 5s. for each pair of workers, one to fork the potatoes and the other to gather them. With regard to accommodation, it is part of the contract between the merchant and the farmer that the latter should provide the merchant's workers with a place in which to live as long as they are working on the farm. The merchants provide blankets, and also fuel and light. The workers are allowed as many potatoes as they can use.

2. The Donegal men (including, however, a certain number from other neighbouring counties) are engaged as harvesters and emergency workers in the East of Scotland and in Northumberland. The counties in which most of the men are employed are the Lothians (Haddington, Edinburgh, and Linlithgow) and Berwickshire; others find their way north into Stirling, Perth, and Fife; but wherever there is harvest or emergency work, there they will go. The Donegal men, having long frequented the districts in which they work, have a good idea of where employment is likely to be found. Some are employed on the same farms from June to December; others go from farm to farm, in the hope of falling in with busy times and higher wages.

Cottages are in many cases available for the use of the men. So far as can be estimated, a good steady worker, with fair luck, will save from £12 to £15 during the season of from five to six months. The number of these workers is estimated to approximate 3000.

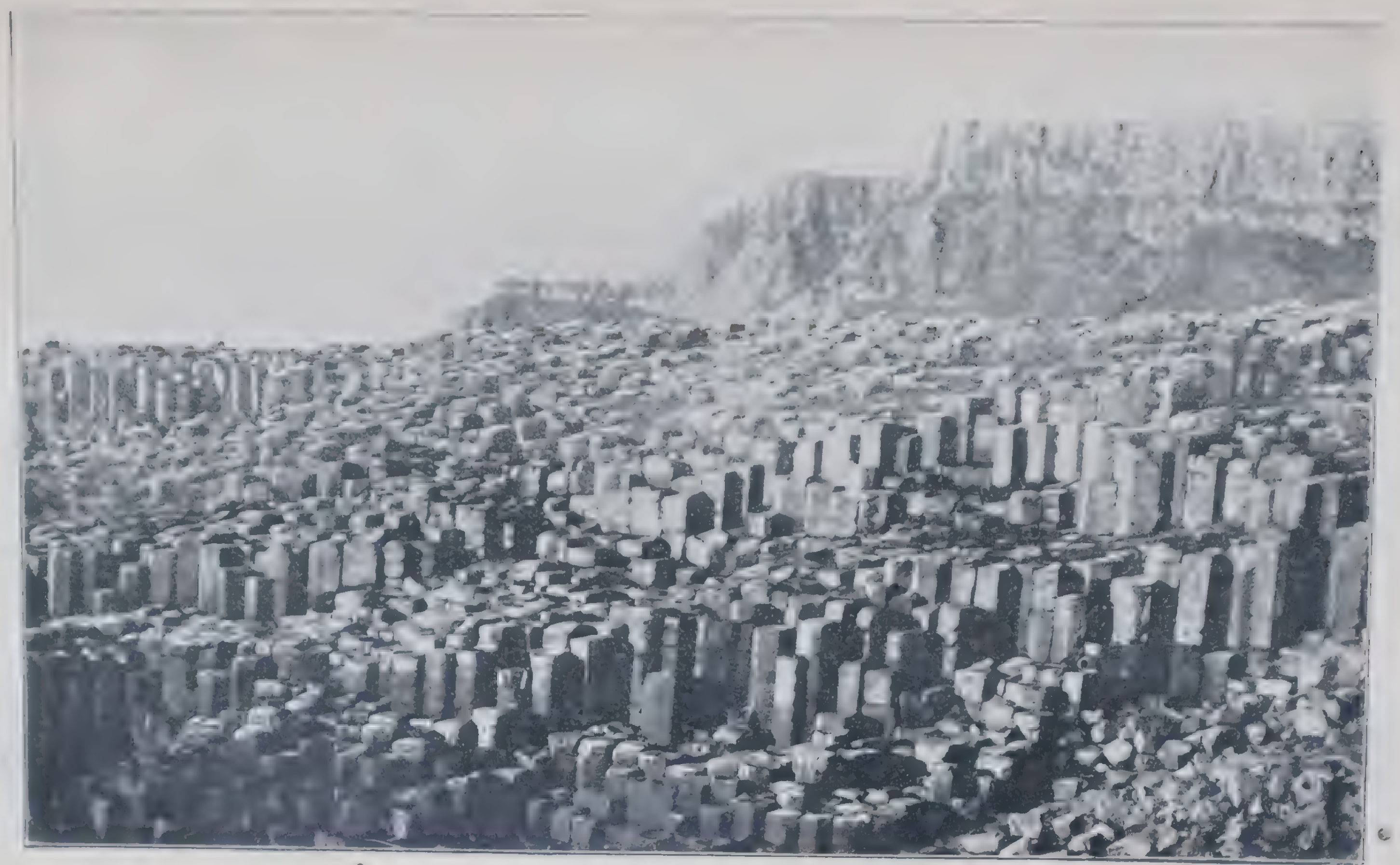
3. The third and much the largest group is that of the Connaught men. The work for which they are required is similar to that done by the Donegal men in Scotland. Some remain on the same farms during their stay; most, however, migrate during the season to at least two or three places. Hence many Irishmen are employed regularly in Lancashire for haying, in Lincolnshire or North Cambridgeshire for corn harvesting, and in Warwickshire or Staffordshire for potato-lifting.

The wages earned by the Connaught men, like those of the Donegal men, are higher than the earnings of the Achill workers; but the risks of unemployment are greater, the work heavier, and the hours often longer.

Agricultural Statistics, "Ireland." Report for 1905.

The Scenery of Ireland

In general surface Ireland may be described as basin-shaped. The traveller will be struck by the mountainous appearance of the coast. Journeying westward from Holyhead, he may see from afar the blue line of the Wicklow Mountains, rising 2000 to 3000 feet above the sea. As he approaches Dublin, the details become clear: the rounded bosses of Killiney, the bold promontories of Howth and Bray, the broken masses of the foothills above Enniskerry, are only a foreground for that great granite moorland, which extends for 70 miles into the south. At Greenore he meets a still more picturesque coast, the huge domes of the Mourne Mountains contrasting with the rugged Carlingford ridge above the quiet water that stretches up to Newry. If our traveller passes westward and round the coast of Donegal and Mayo, he views walls of rock at times 2000 feet in height, the noblest cliffs in all the British Isles;



Valentine and Sons. Ltd

GIANT'S CAUSEWAY.

he then encounters rugged Connemara, and the high limestone terraces of Northern Clare. Farther south, peak after peak, range after range, bars him out from the interior of the country, culminating in the grey and cloud-capped masses that look down on Bantry Bay.

Surely this Ireland must be a land of mountains. Yet the same traveller may cross from Dublin to Galway, a distance of 115 miles, without encountering a genuine hill upon the way. He may pass, again, from Dundalk to Mallow, and will feel himself in a great plain, above which a few ranges rise, quite unimportant when compared with the extent of brown bog and level meadow land. The highlands of Ireland are, in fact, massed upon its margin, while the central area is a broad depression, in which numerous bogs and lakes have gathered. There is thus no well defined watershed in the country, with rivers radiating from it. It seems much a matter of chance whether a stream rising in one of the central counties should run into the Irish Channel or the Atlantic. The plain is, in fact, a sort of gathering ground for the waters that trickle from the surrounding hills, and for the sand and gravel that they wash down.

GRENVILLE COLE, F.G.S.—*Ireland: Industrial and Agricultural*
Brown and Nolan, Limited.

Ulster

The traveller who arrives in Belfast, whether he comes via Glasgow or Barrow, Ayr or Liverpool, or minimizes his seafaring by the adoption of the Stranraer and Larne route, will find little there to bear out the generally received statement that in Ireland the finest scenery of all lies on the coast. For though the city thrives apace, and prospers highly with its busy docks and mills, it has no specially attractive surroundings to set off its comfortable red-brick glow. Perhaps the fact which most strongly impresses a new-comer is that the little river Lagan must be for its size the very dirtiest stream in the United Kingdom. But we need not go far to seek instances which tend to confirm the theory that Erin does show her fairest face to her encircling seas. If we turn northward along the Antrim coast, we presently see it breaking into a line of most picturesque cliffs, skirting which we come into the region of "the Glens," where the green woods rustle and the white waterfalls murmur, all within reach of the sound of the salt surges. Here Cushandall, one of the prettiest villages in the country, offers a convenient halting-place, or Ballycastle, nearer to where the cliffs culminate grandly in Fair Head, a huge precipice over 600 feet high, the extreme north-eastern corner of the island, whence you can look and descry the shadowy outlines of Islay and Jura and Ailsa-Craig.

But a brief journey farther westwards brings us to that fantastically congealed lava-flow, known as the Giant's Causeway.

It is during a storm that the Causeway puts on its most impressive aspect, when the caves' mouths are choked with smothering foam, and the spray drives in sheets of white smoke athwart the clustered dark columns and black sloping screes, until the whole enormous pile looks like some Titan-built temple going visibly to wrack and ruin before his eyes. The Causeway left behind, the northern coast has nothing of equal interest to show, so we may diverge a little way inland, to where Lough Foyle becomes a broad-flowing tidal river, and where the city of Londonderry sits on her wave-girdled height. It is easy to paddle northward again by steamer and regain the coast at Moville, the pretty little watering-place, set on a green bank by the mouth of the Lough, where the great American liners call with their mails, and where many an emigrant has his last glimpse of the Old Country. But when once we have doubled its north-western corner, and have turned southward along the wild shores of Donegal, we pass into a region of vast cliff-ramparts and sea shouldering crags, the colossal fretwork wrought by Æonian waves. For here the Atlantic foam seethes into innumerable bays and creeks, less labyrinthine, perhaps, than those of Connemara farther south, but dominated by loftier mountains. Chief among these is Slieve League, near Carrick, which confronts the ocean with a façade of rock almost 2000 feet high, while Glen Head and Sturrall, a neighbouring pair of majestic promontories, take up a more aggressive attitude. Close at hand lies Glen Columbkille, a district consecrated to memories of St. Columba, who has left there a miraculous well and a wonder-working stone, which the people still sometimes carry off to their homes as a cure for blindness.

JANE BARLOW.—*Round Ulster.*

Belfast

The city of Belfast is situated at the extremity of Belfast Lough, formerly called Carrick Fergus Bay, from the town and castle of that name, and at a period when Belfast was too insignificant a place to be noticed upon the maps of the time. The lough is an arm of the sea, about 12 miles in length; the breadth at the entrance is about 5 miles, which decreases gradually towards the extremity where the river Lagan joins it at the city harbour, with its miles of quays and docks for foreign-going ships, iron shipbuilding, and marine engineering works, etc., which here line both sides of the harbour.

On approaching Belfast by steamer the stranger cannot fail to be struck with the picturesque beauty of the lough, the smiling villages scattered along its margin, and the hills rising behind on either side, running in a nearly parallel course from the entrance to the lough, and stretching far away up the valley of the Lagan.

In 1613 the lough extended into what is now the heart of the city. Various extensions of the land have taken place from time to time, and where once the lonely heron waded undisturbed in the shallows of the lough, the harbour-works have extended for miles into the sea, and the ceaseless din and hammering of the iron shipbuilding yards and engineering works fill the air. Hundreds of acres of land have been reclaimed from the lough on either side of the river, on which extensive ranges of warehouses and docks for the accommodation of foreign shipping have been constructed.

* * * * *

It is now over fifty years since the foundation of Harland and Wolff's Works was laid, the nucleus being the Belfast Ironworks, which intended to begin the manufacture of iron in Belfast. Their purpose was defeated by the expense of importing coal: but the second part of their enterprise—the shipyard—prospered, in spite of the handicap of importing both iron and coal. The firm now stands at the head of the shipbuilding trade of the world. From 1890 to 1894 it turned out the greatest tonnage of any concern in the kingdom, and was only prevented from doing so in 1895 by the engineers' strike, which delayed the launching of several vessels.

"Belfast," *Handbook of British Association*, 1902.

The Irish Coast

The sea, indeed, does little for Ireland. Into the stately waterways of Cork, of Galway, of Limerick, the tide twice a day comes brimming up, filling with its inexhaustible flood the spaces between the imposing, empty warehouses. But its majestic invitation goes unheeded; the beautiful buildings, raised when Ireland had a population and a trade, are crumbling and deserted; great chambers that once resounded with the inspiring clamour of business know it no longer; and where formerly the stevedores sweated, carts rattled, and merchants made their exchanges, little barefoot children now play undisturbed in the sunshine. These western ports were nobly furnished by Nature and by man for the accommodation of shipping, but the ships pass them by far out at sea. They just exist, derelict and half ruinous, unvisited save by the punctual tides.

And along a coast unmatched in the world for its bays and inlets and roadsteads, you may note blight and desolation marking the sea's revenges. Denied its toll of commerce and ocean-going ships, it sweeps round the coast from Donegal to Cork, savagely withholding support and livelihood.

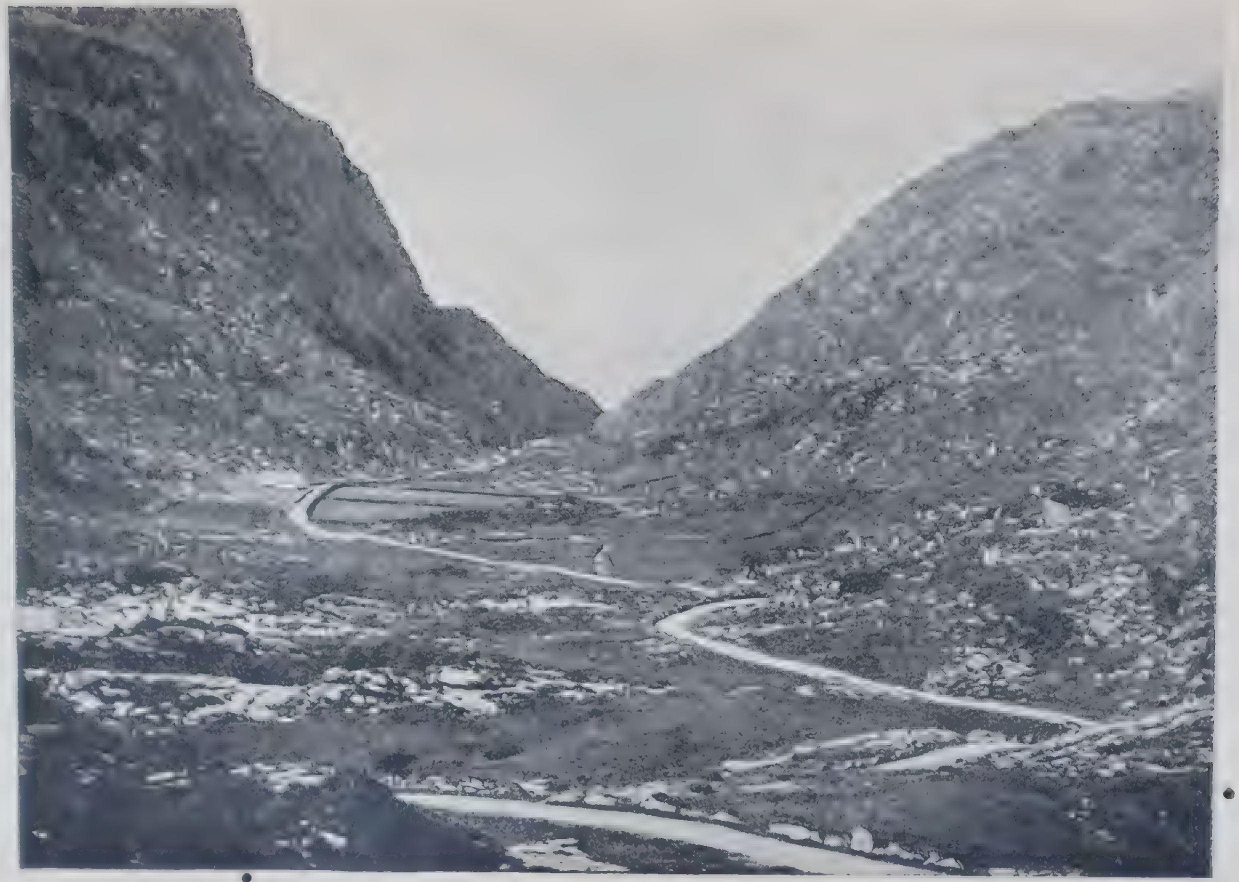
To look at the map one might think there was not a mile along the western coast of Ireland where a boat could not be launched; but, as a matter of fact, places where the business of fishing can be carried on are but few and far between. The bays are there, and the deep-water roadsteads; but the little breakwaters and harbours, in the shelter of which small boats might be kept, are missing—there is no money to build them. The great Atlantic surges come smashing from their thousand-mile journeys, unchecked by any artifice of man, and where they throw their weight on the shore no boats can profitably be kept. Here and there where the Congested Districts Board has made a little harbour, a whole patch of country has been turned from starvation to contentment; but they are only a few among many a hundred miles of want.

A. B. F. YOUNG.—*Ireland at the Cross Roads.* Grant Richards, London, 1904.

By permission of the Author.

The West of Ireland

A line drawn on the map from the head of the great bay called Lough Swilly in Donegal, to that of the still finer harbour of Bantry Bay in West Cork, will cut off almost all the really poverty stricken regions of Ireland to the shores of the Atlantic. The visitor who passes north from Killarney to Connemara, and to the Donegal coast, would be apt to form a very false idea of the prosperity of Ireland if he judged the country only from these wild western provinces,



W. Lawrence, Dublin.

GAP OF DUNLOE, KILLARNEY.

and was unacquainted with the beautiful lands between Dublin and Cork, or the fine pastures of Roscommon. A region of rugged mountains, moor and bog, stretches from Kerry to the Rosses in Donegal—a land full of poor landholders, subject to starvation whenever a wet season leads to the failure of the potato crop, and a land which appears steadily to have deteriorated, and to have become more desolate within the last four or five centuries. But east of our boundary nearly two-thirds of Ireland may compare with England in cultivation and prosperity—a prosperity which recent trade returns show to be steadily increasing. . . .

This western region is the land with which any statesman responsible for Irish well-being has to deal. In the great famine years, 1845-46, it as yet had no roads, and the people died before any help could be brought. Good roads now run in all directions, and such a calamity has become impossible. Clifden in Connemara, Achill Island in South Mayo, Killala which stands below its low-leaning tower at the head of Killala Bay in North Mayo, Killybegs in Donegal, and Ballinrobe east of Loch Mask, are now all reached by railway. Only Belmullet, in the north-west corner of Mayo, remains a world's end 40 miles from any railroad. The good that has been done by these lines, and by those in Cork and Kerry, is already becoming manifest in the facilities for migratory labour to England and Scotland, and in the cheapening of supplies. The door to civilization has been opened to a people once entirely cut off from the world. Nor are railways the only boon bestowed of late, for the improvement of stock, drainage and reforesting of bogs, the development of the fishing and kelp industries, the building of better dwellings for the poor, and the enforcement of sanitary Acts, all engage Government attention. The terrible typhus fever still lingers in Connemara, and is clearly due to the crowding of human beings with their beasts in common hovels; but it is no longer the scourge of half a century ago. The fresh sea breezes which prevail all over the west of Ireland render its climate one of the healthiest in the world in spite of rain, and it is only the ignorance and prejudice of the peasantry that leads to the outbreak of fever, especially in years of dearth. . . .

The yearly routine of village life includes a month's hard work in putting in potatoes, and another month in tending them. The turf for the winter is then cut, and the late summer and winter is an idle time. The worst month in the year for the peasant is July, when the store is exhausted and the new potatoes unripe. In common speech, "the July is on him" is a term for misfortune. In districts, however, such as Donegal and Achill Island, with parts of Mayo, the men cross over in June to England or Scotland for the hay-making and harvest. . . .

It is asked, Why should the Irishman come over to make the hay and reap the crops in England and Scotland, and how is it that he goes home again and does not stay? That he comes over is evidence that he is not unwilling to work. He is sent for by the farmer because his wages are low. That he returns home is not a matter of sentiment alone, nor due to the fact that he returns to a Roman Catholic country. The winter is milder than in Scotland, the rent is cheaper than paying for lodgings in Scotland, the turf fire is warmer and more cheerful than the small coal he must buy at high price in Scotland. The turf fire costs him, perhaps, £3 for the family for all the year. While the man works abroad the family live cheaply at home, and till the potatoes and fatten the pigs. There are thus very good reasons why migratory labour should pay the Irish peasant best, and the change is welcome to him when life would otherwise be very monotonous.

Blackwood's Magazine, May, 1896.

By permission of the Publishers.

The Harvest of the Sea

Tory is the northernmost, barrenest, and strangest of the many strange and barren islands that fringe Ireland's Atlantic seaboard.

Tory is well posted for what is called the May fishing—a new development on this coast. The take of herrings inside the bay and right up the shallow channels has always come in or after harvest-time, and this fishing can be worked by small boats, even by curraghs. Winter weather has to be faced—last year the big fishing was done near Christmas—but there is no need to go far to sea. Some fourteen years ago the Board (*i.e.*, the Congested Districts Board of Ireland) began on Downings its work of supplying boats, with skilled fishermen to sail in each as instructor; and they started trade by setting up a curing-station where they themselves as merchants took two-thirds of the fish at a price (one share in every three going to repay expenses), and disposed of the whole take. Soon competitors sprang up; merchants from English houses came to stand and bid against the Board's buyer; and for many years now the whole trade has been purely independent, maintained by a brisk competition between rival buyers, each of whom has his own steamer plying to Glasgow with the freight of herrings.

It was soon found, when the fish came to be marketed regularly and in large quantities, that they outclassed even the produce of the Shetland fisheries, and to-day Downings' Bay herrings command a price of their own in the markets of the world.

For the Tory men this fishing was a godsend. Their farms were of no account, and the fish were at their doors.

* * * * *

The cliffs along the North Mayo range about 500 or 600 feet, and are therefore not comparable in height with

Slieve League or Achill. But at every point great towers of rock stand out; clefts open inwards; and the whole face of the rock is lined and fluted by the dip of the strata, as if some artist had been at work with a conscious purpose of decoration. Few see the picture, for this corner is among the remotest in Ireland. I noticed that here the curraghs were fashioned with laths, and not with rods and wicker-twigs for the body of the boat. On Sheephaven and Mulroy there is plenty of wooding in reach, and from the Rosses men come east to cut rods. But once to the south of Donegal Bay, lath is the universal material—a testimony to the treelessness of the region. There were slight divergences also in the type of build, but here the men who lay about under the cliffs fishing with handlines were in a curragh not unlike the Sheephaven type. They were catching fish in plenty, but had little inducement to do so, for here is no port of call for steamers, and the rail is some forty miles off.

Yet there are probably no waters round the British Isles richer in fish than these. Men living on that coast should be able to earn, with the spring mackerel fishery, the salmon drift-nets in June and July, and the autumn mackerel again, by far more money than can be got by the yearly trip to England or Scotland. A glance at the map shows that Mayo is just like Western Donegal—a square block of country surrounded roughly on three sides by a sea, which runs into numberless bays and inlets, and is deep up to the cliffy shores, scattered with rocks and small islets, weed-fringed, a vast harbourage for fish. And in Western Donegal, these last years, I am sure that money—well-earned money—has been plentier than in almost any part of Ireland you could name.

The determining factor in the situation has been the presence of a proper line of transport. . . . In Donegal a line has been run along the mountain sides (the land, thanks to the wise liberality of local landlords, for the most part costing nothing), so as to sweep the coast from Sheephaven to Burton's Point. Southward there are railheads at Killybegs and Glenties, so that fish can always be landed within reasonable carting distance of the train. For the herring-fishery this is not essential, since the trade can be served by steamers, but the salmon and mackerel must go by a speedier delivery.

The salmon drift-fishery, which is entirely a new thing in North Donegal, though it has always been followed from Inishowen eastwards, began in the west of the county, somewhere off Slieve League, and with the advent of the railway spread north. Last year big money was earned by men working from the islands about Burton's Point, fishing mostly in the sound of Tory.

The value of the produce of Irish waters is an immense national asset, and peasant proprietary threatens its very existence. Until it is recognized that the salmon in a river are in reality public property, over and above the temporary right to take them by legal means, there can be no security that they will not be swept out of existence, as they have been on the Atlantic seaboard of America. But, once show the coast fishermen that they have a large pecuniary interest in enforcing the regulations upon the innumerable small spawning rivers, and you have a great part of your supply secured. The wider spread the interest in fish conservation, the better the chance for fish.

All this detail will, I trust, have interest for those who are watching in Ireland the results of a coherent policy, whose object is, in the last resort, to make it worth the while of Irishmen to remain in Ireland—to offer some bid against the inducements which the United States hold out to able-bodied and healthy citizens. The thing cannot be done by doles; it can only be done by creating wealth—that is, by assisting men to create it. And remember that the Board in this case has simply set things going. It taught the men to handle sailing-boats and nets with the same dexterity as they had handled curraghs and lines; it provided a line of railway for transport.

Wealth has been created and singularly well distributed in a poor country. That is what I see in Donegal.

STEPHEN GWYNN. *Blackwood's Magazine*, September, 1904.
By permission of the Publishers.

Donegal

Glen Columbkille is the heart of Donegal. And if you wish to know the hearts of the people, you can best understand them in that solitude. The neighbouring cliffs are sheer walls. Glen Head stands erect, 800 feet high, and is dwarfed by the precipitous flank of Slieve League over Carrick. From the brink of Slieve League you see the waves flash 1800 feet below. Nor are the inland heights gradual; Mount Muckish, for instance, and Mount Errigal have sides that resemble gigantic fortifications. The granite walls by the sea are grimly defensive. Yet many smooth strands are beneath them, and many calm inlets, such as Lough Swilly, the Lake of Shadows, are sheltered. The shadow of the mountains beside it gave Lough Swilly that name.

The Highlanders as you see them to-day are calm and laborious; they are peaceful, and yet it is wiser not to meddle with them. This is a hardy stock and a silent one, moulded by solitude and a sea-faring life. Because they live among rocks, they have to dare the North Atlantic for food, or cross the rough Moyle to cut the harvests of strangers. They do this with little reluctance, for they have been strengthened by the vigorous air; here you find none of the terror with which the fishermen of Connemara regard the ocean; neither will you observe their despairing melancholy. If these have a melancholy look, as they often have, you feel that their sadness is a pleasure to them, and a wholesome one. They have the brave pride of independence. In no land will you see a more dignified hospitality. Even the poorest man is proud of his home, and with reason, for however rude it may be, it represents infinite toil. You will find their crops growing in unnatural places, on the sandy edges of cliffs, and up in the mountains between clusters of rocks, and you will learn that some of these high fields have been made up by the simple process of carrying the soil from beneath. You will see young girls digging potatoes, or tugging the nets, or carrying heavy creels on their backs up the long mountain paths; and the rough cabins are musical with the murmur of looms. Here the old ways of extracting dyes from the heather are followed, and so are the old methods of weaving, that are not to be rivalled by any machine. When there is such industry one might expect comparative wealth; but that is not to be found. This is one of the poorest peoples on the face of the earth, and one of the happiest. Though their home is so stern, they can imagine no worse calamity than exile from it. Life is full of labour for them; but the peace of Glen Columbkille abides in their hearts.

FRANK MATHEW.—*Ireland*. A. and C. Black, 1905.
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BIBLIOGRAPHY.

Note

§ Important papers treating of the Geography of Great Britain appear from time to time in the various scientific journals, of which the most generally useful for the English student are *The Geographical Journal* and *The Scottish Geographical Magazine.*

§ Of Guide-books the most comprehensive are the series edited by Mr. M. J. B. Baddeley, *Thorough Guide Series*, 5s., and by Mr. John Murray, *English Handbooks*, about 6s. The volumes in these series contain useful maps. Less expensive is the series of topographical guides, illustrated, published at 1s. by the *Homeland Association, Ltd.*

The handbooks issued by the *British Association* for many of the large towns of the British Isles include chapters on the industries and growth of the towns.

§ The *Victoria County Histories of England* form an indispensable source for the student of geography. They include chapters written by specialists on the geology (with map), flora, antiquities, industries, agriculture, etc., of each county.

The volumes of the *County Histories of Scotland* (William Blackwood and Sons, Edinburgh) contain full bibliographies.

§ An exhaustive Regional Bibliography of the United Kingdom is in course of publication in the pages of *The Geographical Teacher* (see vol. ii., pp. 176, 274 ; vol. iii., pp. 37, 280 ; vol. v., p. 52).

I. General

Aflalo, F. G.—*Sea-fishing Industry of England and Wales.* Ed Stanford. 1904.

Avebury, Lord.—*The Scenery of England.* Macmillan. With Bibliography.

Buchan, Dr. A.—"Temperature of the British Isles." *Journal of School Geography*, vol. ii., 1898.

Chisholm, G. C.—"Distribution of Towns and Villages in England." *Geographical Journal*. January and November 1907.

Codrington. Th.—*Roman Roads in Britain.*

Dawkins, Prof. Boyd.—*Early Man in Britain.* Macmillan. 1880.
Cave Hunting. 1874.

Geikie, Sir A.—*Ancient Volcanoes of Great Britain.* Macmillan 36s.
Landscape and Imagination in History. Macmillan.

Geikie, Prof. James.—*The Great Ice Age.* W. Isbister and Co. 1874.
"Our Coal Supply." *Pall Mall Magazine*, June 1901.

Grant Allen.—*County and Town in England.* Grant Richards. 1901.

Herbertson, A. J.—*The Senior Geography*, pp. 114-153: "Great Britain." Clarendon Press. 1907. 2s. 6d.

Hull, Prof. E.—*Coal-fields of Great Britain.* Hugh Rees. 1905.
Physical History of the British Isles. 1882.

Jukes-Brown, A. J.—*Building of the British Isles.* George Bell.

Mackinder, H. J.—*Elementary Studies in Geography: Our own Isles.* George Philip. 1907. 2 parts, 1s. 3d. each.
Britain and the British Seas. Second edition. At the Clarendon Press. 1907.

Mackintosh, D.—*Scenery of England and Wales.* 1869.

Martel, E. A.—"British Caves and Speleology." *Geographical Journal*, November 1897.

Mawley, E.—"Weather Influences on Crops." *Journal Royal Agricultural Society*, vol. x.

Mill, Dr. H. R.—"England and Wales viewed Geographically." *Geographical Journal*, December 1904.
The International Geography. Part I.: "British Isles." Macmillan. 1s.

Ramsay, Sir A. C.—*Physical Geology and Geography of Great Britain.* Ed. Stanford. 1872.

De Rance.—*The Water Supply of England and Wales.*

Reynolds, J. B.—"The British Isles." *Regional Geography.* A. and C. Black. 1908.

Snape, H. J.—"Hints towards Teaching the Historical Geography of Britain." *Geographical Teacher*, iv. 2.

Windle, B. A. C.—*Life in Early Britain.* David Nutt. 1897.

II. SCOTLAND.

Denny, Prof. A.—"An Outpost of the British Isles" (St. Kilda). *Travel*, July 1902.

Dron, R. W.—*Coal-fields of Scotland.* 1902.

Geddie, John.—*The Fringes of Fife.* David Douglas 1894.

Geikie, Sir A.—*Scenery of Scotland.* Macmillan.

Geikie, Prof. James.—"Old Scottish Volcanoes." *Scottish Geographical Magazine*, xxiii., 1907.
Groome.—*Ordnance Gazetteer of Scotland.* 1903.
Henderson, T. F.—*Scotland of To-day.* Methuen. 1908. 6s.
Hibbert.—*The Shetland Islands.*
Johnson, C.—*The Land of Heather.* A. and C. Black. 1903.
Lees, Dr. Cameron.—"Inverness." *County Histories of Scotland.* William Blackwood. 1897.
Lewis, F. J.—"Scottish Peat Mosses." *Scottish Geographical Magazine*, May 1906.
Luther, A. V.—"Weavers of the Western Isles." *Journal of School Geography*, April 1902.
MacCulloch.—*The Misty Isle of Skye.* Oliphant, Anderson, and Ferrier. 1905.
Macnair, Peter.—*The Geology and Scenery of the Grampians.* James Maclehose. 1908.
Maxwell, Sir.—*Scottish Land Names* (Rhind Lectures). 1893.
Millar, H.—*The Cruise of the "Betsey."*
Muir, J. H.—*Glasgow in* 1901. William Hodge and Co. Glasgow. 1901.
Munro, Neil.—*The Clyde.* A. and C. Black. 1907.
Privat-Deschanel, P.—"Distribution of Population in Scotland." *Scottish Geographical Magazine*, November 1902.
Rampini, Dr. Charles.—"Moray and Nairn." *County Histories of Scotland.*
Richardson, Ralph.—"Physiography of Edinburgh." *Scottish Geographical Magazine*, July 1902.
Russell, E. J.—"The Shetland Islands." *Journal of Manchester Geographical Society*, July 1902.
Stevenson, Alan.—*Account of the Skerryvore Lighthouse.* A. and C. Black. 1848.
Tarr, R. S.—"The Scottish Highlands." *American Geographical Society*, December 1908.
Watt, F. (and Henderson, T. F.).—See above.
Wordsworth, D.—*Tour in Scotland.*

III. THE PENNINES: THE LAKE DISTRICT AND THE NORTH.

Abraham, G. D.—*Rock Climbing in English Lakes.* Abraham, Keswick.
Atkinson.—*Forty Years in a Moorland Parish.*
Booker, E. A.—*Moors, Crags, and Caves of the High Peak.*
Brabant, F.—"The English Lakes." *Little Guides.* Methuen. 1902.
Bradley, A. G.—*The Romance of Northumberland.* Methuen. 1908.
Bogg, E.—*Ten Thousand Miles in Wharfedale.* John Heywood. 1904.

Dale.—*Scenery and Geology of the Peak of Derbyshire.*

Firth, J. B.—*Highways and Byways in Derbyshire.* Macmillan. 6s.

Fletcher, J. S.—*The Enchanting North.* Eveleigh Nash. 1908.
A Book about Yorkshire. Methuen. 1908.
A Picturesque History of Yorkshire. 4 vols. Caxton Publishing Company.

Harper, C. G.—*The Great North Road.* Chapman and Hall. 1901
The Manchester and Glasgow Road.

Harrison, H.—*Place Names of Liverpool District.* Elliot Stock. 1898.

Home, Gordon.—*Yorkshire Dales and Fells.* A. and C. Black. 1906.
Yorkshire Vales and Wolds. A. and C. Black. 1908.
Yorkshire Coast and Moorland. A. and C. Black. 1904.
Evolution of an English Town (*Pickering*). J. M. Dent and Co. 1905.

Lewis, F. L.—"Distribution of Vegetation of the Rivers Eden, Tees, Wear, and Tyne." *Geographical Journal*, March 1904.

Leyland, J.—*The Yorkshire Coast and the Cleveland Hills and Dales.* Seeley and Co. 1892.
The Peak of Derbyshire. Seeley and Co. 1891.

MacMunn, N. E.—"The Economic Historical Geography of a County (Essex and Cumberland)." *Geographical Teacher*, iv. 1

Marr, J. E.—"The Waterways of English Lakeland." *Geographical Journal*, June 1896.

Neill, Dr. H. R.—"The English Lake District." *Journal of School Geography*, vol. ii., 1898.
"Bathymetrical Survey of the English Lakes." *Geographical Journal*, July and August 1895.

McFarlane, J.—"The Manchester Ship Canal." *Geographical Journal*, November 1908.

Muir, Ramsay.—*A History of Liverpool.* Williams and Norgate. 1907.

Moncrieff, H.—*The Peak Country.*

Norway, A. H.—*Highways and Byways in Yorkshire.* Macmillan. 6s.

Phillips, J.—*Rivers, Mountains, and Sea-coast of Yorkshire.* 1853.

Rawnsley, Canon H. R. *Life and Nature at the English Lakes.* J. MacLehose and Sons. Glasgow. 1899.

Royse.—*Geology of Castleton in the High Peak.*

Woolacott, D.—"Rivers and Valleys of Northumberland and Durham." *Geographical Journal*, July 1907.

Wordsworth, W.—*Guide to the Lakes.*

Yule, Oldham H.—"The Manchester Ship Canal." *Geographical Journal*, June 1894.

IV. THE SCARPLANDS AND THE MIDLANDS.

Baker, E. A., and Balch.—*The Netherworld of Mendip.* Baker. Clifton. 7s. 6d.

Buckman, S. S.—"The Genesis of the Severn." *Natural Science*, April 1899.

Compton, T.—*A Mendip Valley.* Stanford. 1892. 10s. 6d.

Davis, W. M.—"The Development of Certain English Rivers." *Geographical Journal*, vol. v.

Duckworth.—*The Cotswolds* (illustrated). A. and C. Black. 6s.

Evans.—*Oxford and the Cotswolds.* Macmillan. 6s.

Foster, A. J.—*The Chiltern Hundreds.* J. S. Virtue. 1897. 5s.

Gallichan.—"Cheshire." *Little Guides.* Methuen.

Gibbs, J. A.—*A Cotswold Village.* John Murray. 1898.

Harper, C. G.—*Oxford, Gloucester, and Milford Haven Road.* 2 vols. 32s.

Herbertson, A. J.—"Oxford Ordnance Sheet." *Geographical Teacher*, i. 4.

Hudson, W. H.—*Nature in Downland.* Longmans. 10s. 6d.

Hutton, W. H.—*By Thames and Cotswold.* Constable. 1903. 10s. 6d

Lushington, P. A.—"Midland and South-Western Junction Railway." *Railway Magazine*, 1898.

Mellors.—*In and About Nottinghamshire.*

Phillips, Prof. J.—*Geology of Oxford and the Valley of the Thames.* Oxford. 1871.

Spicer, Rev. E. C.—"Chiltern Valleys." *Geographical Journal*, September 1908.

Tompkins, H. W.—*Hertfordshire Highways and Byways.* Macmillan. 6s.

Vincent, J. E.—*Berkshire Highways and Byways.* Macmillan. 6s.

Watts, W. W.—"Charnwood Forest: A Buried Triassic Landscape." *Geographical Journal*, June 1903.

White, G.—*Natural History of Selborne.*

Windle, B. C. A.—*The Malvern Country.* Methuen. 1901.

V. WALES AND THE WELSH MARCHES.

Abraham, G. D.—*Rock Climbing in North Wales.* G. P. Abraham. Keswick. 1906.

Baring Gould, Rev. S.—*A Book of North Wales.* Methuen. 1903.
A Book of South Wales. Methuen. 1905.

Borrow, George.—*Wild Wales.*

Bradley, A. G.—*In the March and Borderland of Wales.* Archibald Constable and Co. 1905.

Bradley, A. G.—*Highways and Byways in North Wales.* Macmillan. 1893. 6s.
Highways and Byways in South Wales. Macmillan. 1903. 6s.
Edwards, O. M.—"Wales." *Story of the Nation Series.* Fisher Unwin.
Farnsworth, C. H.—*A School Handbook of Glamorgan.* Scholastic Trading Company, Cardiff. 4d.
Harper, C. G.—*The Holyhead Road.* 2 vols. Chatto and Windus. 1902.
Howard, F. T.—*The Origin of the Physical Features of South Wales.* Published at Cardiff.
Salt, H. S.—*On Cambrian and Cumbrian Hills.* Fifield. 3s. 6d.
Thomas.—*Beautiful Wales.* A. and C. Black.

VI. EAST ANGLIA; SOUTH-EAST ENGLAND AND THE THAMES BASIN.

Belloc, H.—*The Old Road.* A. Constable and Co. 1904.
The Historic Thames. J. M. Dent and Co. 1907.
Sussex. A. and C. Black.
Besant, Sir W.—*Early London.* A. and C. Black. 30s.
South London.
Westminster. Chatto and Windus. 1907.
Burrows, Montague.—"The Cinque Ports." *Historic Town Series.* Longmans. 3s. 6d.
Clive Holland.—*From the Foreland to Penzance.* 10s. 6d.
Cook, Mrs. E. T.—*London Highways and Byways.* Macmillan. 6s.
Davies, A. M.—"The Geography of Greater London." *Geographical Teacher*, i. 2.
Dann, E. W.—"Reigate and its Surroundings." *Geographical Teacher*, iv. 15.
Dewar.—*Wild Life in Hampshire.* Dent. 1899. 7s. 6d.
Dutt, W.—*The Norfolk Broads.* Methuen. 1905. 6s.
Highways and Byways in East Anglia. Macmillan. 1901.
"Norfolk." *Little Guides.* Methuen. 1902.
"Suffolk." *Little Guides.* Methuen. 1904.
Gomme, G. L.—"London as the Capital of the Empire." *Contemporary Review*, 1896.
Gregory, J. W.—"Physical Features of Norfolk Broads." *Natural Science*, July, 1892.
Hissey, J. J.—*Over Fen and Wold.*
Jerrold, W.—*Highways and Byways in Kent.* Macmillan. 6s.
Highways and Byways in Middlesex. Macmillan. 6s.
Johnson, Prof. E. R.—"An American Study of London." *Geographical Teacher*, iv. 2.
Lucas, E. V.—*Highways and Byways in Sussex.* Macmillan. 6s.

Mill, Dr. H. R.—"South-West Sussex: A Fragment of the Geography of England." *Geographical Journal*, March and April 1908.

Mitton, G.—*The Thames*. Illustrated by Mortimer Menpes. 20s.

Moutray Reed, D. H.—*Highways and Byways in Hampshire*. Macmillan. 6s.

Parker, Eric.—*Highways and Byways in Sussex*. Macmillan, 6s.

Roxby, P. M.—"Historical Geography of East Anglia." *Geographical Teacher*, iv. 6.

Wheeler.—*The Fens of South Lincolnshire.*

VII. South-West England and the Channel.

Baring Gould, Rev. S.—*A Book of the West*. Methuen. 1899.
A Book of Dartmoor. Methuen. 1899.

Besant, Sir W.—*Armorel of Lyonnesse* (a novel).

Bradley, A. G.—*Round about Wiltshire*. Methuen. 1907. 6s.

Carey, E. F.—*The Channel Islands* (illustrated). A. and C. Black. 1904.

Clayden, A. W.—*History of Devonshire Scenery*. Chatto and Windus. 1908.

Clowes, W. L.—"Strategical Value of Channel Islands." *Nineteenth Century*, 1900.

Denny, Prof. A.—"The Scilly Islands." *Travel*, March 1898.

Folliott Stokes, A. G.—*From St. Ives to Land's End*. Greening and Co. 1s.

Fripp, Mrs. C. E.—"Dorset." *Geographical Teacher*, Autumn, 1907.

Greswell, Rev. W. H. P.—*The Land of Quantock*. Barnicott and Pearce, Taunton. 1903.

Harper, E. G.—*The South Devon Coast*. Chatto and Windus. 1907.
The North Devon Coast. Chatto and Windus. 1908.

Hill, J. B.—"The Cornish Coast." *Victoria County History: Cornwall*, vol. i.

Hind.—*Days in Cornwall*. Methuen. 6s.

Hudson, W. H.—*The Land's End*. 10s. 6d.

Johns.—*A Week at the Lizard.*

Jukes-Brown, A. J.—*Hills and Valleys of Torquay*. Published at Torquay, 1907.

Kingsley, Charles.—*Prose Idylls.*

Norway, A. H.—*Devon and Cornwall: Highways and Byways*. Macmillan. 6s.

Page, J. Ll. W.—*Exploration of Dartmoor*. Seeley and Co. 1895.
Rivers of Devon.
Coast of Cornwall.
Coasts of Devon. Seeley and Co. 1893.

Parker, Sir G.—*The Battle of the Strong* (a novel).

Quarterly Review.—"The Pleasant Land of Devon. *Quarterly Review*. 178, 1894.
Tonkin, J. C.—*Guide to Scilly Islands* (Homeland Association Handbooks).
Treves, Sir F.—*Highways and Byways in Dorset*. Macmillan. 6s.

VIII. IRELAND

Barlow, Jane.—"Round Ulster" in *Where to go for a Holiday*. 1896.
Belfast.—Guide. British Association. 1902.
Cole, Grenville.—*Ireland: Industrial and Agricultural*. With Bibliography. Brown and Nolan, 1902.
Gwynn. S.—*Highways and Byways in Donegal and Antrim*. Macmillan.
"The Harvest of the Sea." *Blackwood's Magazine*, September 1904.
Hull, Prof. E.—*Physical Geography and Geology of Ireland*.
Mathew, F.—*Ireland*. A. and C. Black. 1905.
Maxwell, Sir H.—*Galloway*. 1887.
Sloan, J. M., and Faed. J.—*Galloway* (illustrated). A. and C. Black. 1907. 6s.
Young, A. B. Filson.—*Ireland at the Cross Roads*. Grant Richards. 1904.

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